JAMAICA.

ANNUAL REPORT

OF THE

DEPARTMENT OF AGRICULTURE

IMPERIAL BUREAU OF MYCOLOGY
4 SEP. 1923

FOR

THE YEAR ENDED 31ST DECEMBER, 1922.

Ordered by His Excellency the Governor to be Printed.

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DEPARTMENT OF AGRICULTURE.

REPORT FOR THE YEAR ENDED 31ST DECEMBER, 1922.

Department of Agriculture, Hope, Kingston P.O.,

15th May, 1923.

Sir,

I have the honour to submit for the information of His Excellency the Governor, the report of the Department of Agriculture for the year 1922.

I.—GENERAL OBSERVATIONS.

From the planters' point of view the year 1922 was one of deficient rainfall, the average precipitation for the Island being 52.38 inches or a deficit of 24 inches on the average rainfall for 50 years.

In some areas of the Island acute conditions of drought prevailed so as to cause serious loss and suffering to the community. The reflex consequences of the favourable rainfall of 1922 were, however, shown in the case of some crops, such as sugar, and in surveying the records of the Island's exports for the year it must be admitted that we did remarkably well despite the unfavourable seasons which prevailed. The year was in most respects a normal year for trade with low or moderate prices prevailing in foreign markets for our Island produce and yet the value of the exports amounted to £4,316,000 as against £3,139,177 for the previous year. This record is encouraging and should justify greater confidence in the development of the resources of the Island, and in the extension of cultivation and the opening up of the hinterland.

The Sugar Industry achieved the high record of 57,000 tons of sugar or just double that exported in 1921. Low prices prevailed until the closing period of the crop when a marked improvement in the value of sugar took place. Despite this large production most of the estates made small profits, and in some cases, have actually lost money on the year's operations.

In the current year a higher standard of value for sugar has been established and the industry now begins to see itself with a reasonable future for assured production.

The policy of Government assistance to the Sugar Industry when *in extremis* as a result of the sensational fall in values in 1921, has been fully justified by the results. The industry was saved and is now in a position to establish itself on a secure basis.

Rum has been almost unmerchantable. The attempt to organise a co-operative factory for the manufacture of Motor Spirit from Rum fell through owing to lack of agreement among the producers. The effect of the failure of the Rum market is a very serious one for the sugar industry of Jamaica, as the existing factory equipment is not efficient for the manufacture of sugar. Jamaica has always relied on the by-product rum to make good the losses in the recovery of sugar in its factories.

Centralisation in Vere and Westmoreland appears now to be necessary in order to obtain efficient factories for the manufacture of sugar under present conditions.

Mosaic Disease has spread considerably in certain areas where it was neglected by the planters.

The Industry was so demoralised by the events of 1920 to 1921 that on many estates all interest in the canes was abandoned and the systematic efforts that were necessary to deal with Mosaic Disease were neglected with the result that a considerable spread of this disease took place.

At the Hope experiment station the Mosaic Disease has been completely eradicated by systematic removal of all infected stools. The "Uba" cane being entirely immune to Mosaic Disease has been found a useful cane for planting where the ordinary canes are badly affected. At the Hope Experiment Station a yield of 102 tons per acre was recorded for "Uba" cane.

The canes were over 20 feet in height and so dense that even a mongoose could hardly penetrate the cane-piece.

Experience indicates that "Uba" cane should be planted at a distance of 6 feet between the rows so that larger canes may be produced. If planted close the canes become very small and reedy. This cane is rapidly extending in Jamaica and will enable sugar cane to be grown on large areas where the old canes would fail to give commercial returns. For feeding stock it is truly a God-send. A yield of 100 tons of material containing 12 per cent. of sugar on an acre of land is, from a cattle-feeding standpoint, a first class crop that compares favourably with the best records of mangels in England or of corn in the United States.

Bananas fell short of expectations by over a million bunches due to the drought, but a substantial recovery has been made by this Industry which now again leads as the chief staple of the island.

The records show that 12,714,000 stems were exported in 1922 to the value of £2,075,000.

For the current year the crop prospects are favourable for an increase of 2 million stems over the exports of last year.

Panama Disease increased to a noticeable degree during the year. Increased vigilance and a larger staff of Inspectors have been devoted to the work of control under the Order. An advisory Committee consisting of four of the leading banana planters was appointed by His Excellency to assist the Director of Agriculture in dealing with Panama Disease. This Board has been of great assistance to me and it is now proposed to enlarge the committee so as to make it still more representative of the banana industry. I am glad to report that for the first quarter of 1923 a reduction of 23 per cent. in the incidence of Panama Disease was recorded compared with the same period of last year. Experiments to test the possibility of reducing the quarantined area in treating a case of Panama Disease have led to the irresistible conclusion that any reduction on the "Clear Chain" of healthy bananas to be destroyed outside any diseased plant leads to a dangerous spread of the disease and eventually to a greater loss of territory . The persistence of the infection of the soil has been shown to extend to a period of ten years on the experimental plot at Balcarres. In the Rio Grande Valley a piece of land which had died out for some (then) unknown cause before the hurricane of 1903 was replanted by an East Indian tenant contrary to the advice of a man who remembered the case. These bananas showed a widespread infection of Panama Disease in 1922 leading to the supposition that the Disease had remained dormant in the soil for a period of nearly 20 years. The plantain has been found to be susceptible to the disease, contrary to our early observations. The "China" Banana and a variety known locally as the "Costa Rican" or "Silver Grey" Banana have both been proved to grow healthily on a soil virulently infected with Panama Disease. Both these immune varieties are being cultivated by the Department at different centres for distribution to owners of diseased land.

Looking at the matter broadly, it must be admitted that during the past two years Panama Disease has spread to an extent that is regrettable. Compared with other countries, however, our control is remarkably successful and with keen vigilance and faithful execution of the requirements of the Order we have reason to feel confidence that Panama Disease can be controlled in Jamaica so as not to injure our industry to a serious extent.

The coconut industry has shown some recovery in output. The export of nuts increased by over 6 million to 30 million nuts while Copra shows an increase of nearly a million pounds over the previous year.

Prices, however, ruled low and the value of the coconut material exported in 1922 was only £1,000 more than in the previous year.

Some planters have been so discouraged by the low prices recently ruling for coconuts that a large number of palms have been cut down in order to grow bananas.

A local Soap-Industry could utilise every coconut produced in Jamaica to supply the requirements for common washing soap.

The coconut cake would furnish valuable feed for dairy cattle.

If capital could be obtained for such an enterprise, the prospects are most favourable for its success.

Coconut Diseases have not been at all prevalent during the year and the general health of the trees in the true coconut areas is good. In the semi-arid districts, outside the favoured coconut zones, many trees have suffered severely from the drought.

Logwood has made a welcome recovery with an export of 25,000 tons or nearly 6 times that of the previous year. Logwood products are credited with a total value of £361,000 as against £137,000 for 1921. This improvement has relieved a good many landowners and afforded regular employment to the wage earners in many places where logwood is the mainstay of industry.

The Orange Oil Industry was rather depressed due to lower prices but the output was maintained.

Citrus Fruits were steady at the dull standard now obtaining. The "Black Fly" still gives trouble and was the subject of advice by the Entomologist who has given special consideration to the control of this pest.

Cacao showed an improvement of about 40 per cent. in value and of about 18 per cent. in quantity. This industry is still rather under a cloud and there is small encouragement for its extension at the present time.

Coffee benefited from favourable markets and with the same output as the previous year an increased price of about 25 per cent. was obtained for this crop.

Conditions are now favourable for coffee and the small settlers who produce the bulk of this product should be encouraged to cultivate, manure and cure their crops in a better way than heretofore.

Pimento has been moving more easily but at very poor prices. Central Europe, formerly a large consumer, is now so disorganised that a glut of Pimento can not be avoided.

A commercial test of the market for pimento oil was made by consigning 150 lbs. of pimento leaf oil, prepared by the Industrial Chemist, to the London Market. Unfortunately, our shipment coincided with a heavy fall in the market for Cloves involving Clove Oil and all Eugenol Oils in the drop in prices. Our oil which had sold in London for 10s. per lb. in 1921 only sold for 5/6d. per lb. at the close of 1922. At this price there is no adequate inducement for the development of a Pimento Leaf Oil Industry in Jamaica. If, however, the markets recover there is no doubt that large quantities of Pimento Leaf Oil could be produced in favourable areas so as to compete with Clove Oil as a source of Eugenol.

We have had applications from the United States for further supplies of this oil. There is, however a duty to be faced which reacts against an American trade with this raw product.

Sisal Hemp has made a further step in its progress as a staple industry. Three factories in Clarendon and the Government factory at Lititz in St. Elizabeth have manufactured fibre during the year. A rope-factory has also been started by private enterprise at May Pen and has produced Sisal rope of superior strength.

The affairs of the new Lititz Factory are dealt with separately in this report. The factory started operations on the 1st December and has produced to date over 50 tons of fibre. For the "No. 1" quality the Crown Agents have obtained an offer of £37 10s. 0d. per ton C.I.F., New York, which we have accepted for a lot of 50 tons. This is the top price of the market (7.7 cents.) and indicates that the arid Lititz Savannah land yields a superior sisal fibre which our English machinery is turning out in first-class condition.

The Tobacco Industry has suffered a further decline and the export trade in cigars dropped 25 per cent. in value and 20 per cent. in quantity. The local cigarette continues to give way to the superior attractions of the imported article.

The trade in Hides shows a marked improvement over the previous year. An embargo against hides from Jamaica was raised by Canada and the United States on the confirmation of the outbreak of Foot and Mouth Disease in September. The United Kingdom remains an open market. Steps have been taken for the disinfection of all hides before they are permitted to leave the area infected with Foot and Mouth Disease. At the time of writing there has been no case of this disase for over three months and the conditions are considered favourable for eradication of the disease in the infected area.

The Cattle Industry suffered a severe blow from the outbreak of Foot and Mouth Disease which took place in July. Owing to lack of experience and knowledge the disease was spread by movement of animals so as to involve the three parishes of Westmoreland, Hanover and St. James before steps were taken to enforce quarántine.

About 30,000 animals passed through the disease between July 1st, 1922 and February 6th, 1923, when the last case was recorded. The mortality averaged a little over 3 per cent.

An extensive campaign of quarantine was effected and the services of a Chief Commissioner from England were engaged in October in order to organise the campaign.

The drought was prejudicial to cattle interests. Water was scarce. Many animals died from lack of food. The dairymen of St. Andrew suffered severely and it is generally admitted that the drought which extended from November, 1921, to April, 1923 was the worst period of drought exxperienced on the Liguanea plain during the past half century.

At the Hope Farm we were able through the use of Silos and a reserve crop of "Uba" cane to carry 350 head of stock on about as many acres of land without buying any grass, hay or forage. An average daily milk yield of 291 quarts per diem was maintained, despite the adverse conditions of drought which prevailed in 1922. Some very promising young stock by our new Sires have been reared. The daughters of the English Guernsey Bull "Elfordleigh Prince," of the American Jersey Bull "Pogis 99th of Hood Farm 40th," and of the Indian Montgomery Bull "Pusa" are of outstanding merit.

The record for the Farm was broken by the heifer "Cognac 1st" which gave 16.5 quarts (43 lbs.) of milk with her first calf.

The grandam of this heifer was a scrub cow that gave only 3 quarts of milk. The daughter of this native cow by the Zebu-Jersey Bull "Experiment" gave 10.6 quarts, while the second cross of dairy blood gave the result above mentioned viz: 16.5 quarts of milk.

The herd at Hope was valued in February by an experienced cattle breeder, Mr. Easton W .Muirhead, after a careful study and examination of each animal, at a total of £9,498. This independent valuation was £288 in excess of the Departmental Valuation made at the close of 1922.

The surplus assets of the Farm now amount to £9,412, while the average annual profit for the past seven years has been £1,122. A recent estimate of the value of the Hope estate, which was purchased

for public purposes in 1913 for £5,443, shows that the building land with 70 chains of frontage on the Hope car line is now worth £20,000 and that the whole estate can be set at about £28,000 in value.

The enterprise known as the Government stock Farm at Hope therefore shows that in ten years it has earned as a public property an increment estimated to amount to £32,000.

The "working account" at the Treasury on which this enterprise has been operated for the past 13 years on a basis of self-development was closed on the 31st March, 1923, with a small balance to its credit.

The Government Stud Farm at "Grove Place" had a very unfortunate year. The serious drought rendered the water-supply so precarious that this limited the capacity of the Stud Farm to receive stock, while on the outbreak of Foot and Mouth Disease the farm was closed to the public as a precautionary measure.

The Stud Farm was re-opened on March 7th, 1923, and is now fully equipped with a thoroughbred stallion, an imported Proof Ass, Hereford, Angus, Sussex, Devon, Brown Swiss, Red Poll, Jersey, Guernsey, Ayrshire, Saniwal, and Hissar Bulls.

The Live Stock at "Grove Place" was valued by Mr. E. W. Muirhead in February, 1923, at £7,058 and was favourably reported upon as to condition. Despite the serious drought the Farm was able to clear £279 during the year and thus reduce the loss made in the previous year to a deficit of £519 on the "Working Account."

This alteration in result whereby a deficit of £800 was converted into a surplus of revenue of £300 is encouraging for the future of the farm which was established under conditions of grave agricultural difficulty. Patience is necessary in dealing with a livestock enterprise. Our experience at Hope indicates that it takes about ten years to establish a successful herd suitable to the conditions to be faced.

The public, meanwhile, are getting the services of the finest lot of Sires ever established on a single farm in the tropics and valuable results to breeders of stock, both great and small, are assured.

Owing to the drought the time-limit fixed by the "Order " for the construction of Dipping Tanks was extended to January 1st, 1923. To date 186 Dipping Tanks have been registered with the Department. These are all supplied with Arsenite of Soda and Paranaph at actual cost of the materials. Experience shows that the Departmental dip costs one-third as much as the commercial proprietary cattle dips and is thoroughly effective. The Government Laboratory must be credited with having saved cattle owners £2,085 during the past year through the supply of departmental dipping materials at a less cost than that of the proprietary articles.

Owing to delay in the provision of the money for the machinery-building at the Government Laboratory this has not yet been completed and it has not been possible to start the experiments on Condensed Milk. It is hoped to be in a position to carry out these experiments shortly.

During the year the department was strengthened by the filling of the officers of Microbiologist, Deputy Island Chemist and Chief Clerk.

II.—PUBLIC GARDENS AND NURSERIES, 1922.

Report by the Acting Superintendent of Public Gardens.

I.—Hope Gardens.

Bougainvilleas.—An effort has been made by crossing the "Ruby" with the *Rosa Catalina* in hope of introducing new seedling varieties and we have been successful in obtaining six seedlings. These are growing well and should flower next year.

Water Garden.—This section of the Gardens was reclaimed during the year under review and much pleasure may now be enjoyed by visitors when they visit the Water Garden. Here the visitor views a large and interesting collection of cool-loving plants growing together under very favourable conditions. The lily ponds are planted with pink and white Nymphaeas. Large clumps of *Eranthemum pulchellum* were planted freely among the ferns. These plants with their deep blue flowers made a very attractive appearance when in bloom during the latter part of the year. Hippeastrums (Garden varieties) were planted around the lily ponds and in the border at the end of the walk. The brilliant colours of these bulbous plants made an excellent display and attracted considerable attention. Tree ferns (*Cyathea serra*) were obtained from the Castleton district for planting around the lily ponds. These have all made splendid growth and now add considerably to the beauty of this spot. Tall-growing shrubs are planted at the back of the ponds to form a background. Mention might be made of some of the most interesting plants cultivated in the Water Garden, viz., *Alpinia nutans, Costus speciosus, Heliconia Bihai, Cyperus alternifolius, Sanchezia nobilis, Marica caerulea, Dieffenbachias, Hedychiums, etc.*

Hippeastrums.—Our selected varieties of Hippeastrums flowered remarkably well last season. The bulbs were taken up in November and 'dryed off' for ten weeks after which they were again planted in beds that had been well prepared with manure. In the following March, all the bulbs came into bloom at the same time making a splendid display with their large brilliant flowers. It has been noticed that when these bulbs have been left in the ground from one year to another the show of bloom becomes very irregular, many of the bulbs producing flowers months after their flowering season.

More seedlings were raised from seed obtained from crossings with selected varieties.

Ornamental Borders.—Three borders were cleared of wild growth, reformed, and then planted with an assortment of flowering shrubs. The long borders were regularly weeded and forked and pruning was carried out on the shrubberies.

Orchid Collection.—The collection of orchids has received constant attention and the condition of the plants is very satisfactory. The time has arrived when fresh importations of orchids might be made as there is now regular attention given to these choice plants. Our collection of orchids, although very healthy in appearance, is lacking in interest owing to the limited number of horticultural varieties now forming the orchid collection. It is intended, when money will allow, to renew the boxes around

the trees in which the orchids are now grown and which were formerly made of packing-case boards. It is quite evident that while these structures remain attached to the trees the orchid walks will never attract the attention which is certainly due to this section of the gardens. Several hundred native orchids were collected from the hills and planted in the gardens. Our number of plants of *Dendrobium Pierardii* was considerably increased when the orchid collection was overhauled. The following orchids flowered during the year:—

Angræcum sesquipedale
Angræcum distichum
Brassia caudata
Broughtonia sanguinea
Bletia florida
Cattleya Bowringiana
Cattleya Mendelli
Coelogyne Mass ngeana
Do. Dayana
Do. ovalis
Dendrobium moschatum
Do. Pierardii
Do. chrysotoxum
Do. aggregatum
Do. nobilius
Do. fimbriatum
Do. primulinum
Epidendrum nutans var. tridentatum
Do. fragrans
Do. nutans
Do. cochleatum
Gongora quinquenervis
Laelia purpurata
Maxillaria tenuifolia
Oncidium luridum
Do. flexuosum
Phaius grandifolius
Phalaenopsis Luddemanniana
Stanhopea oculata
Do. eburnea
Do. cirrhata
Do. tricornis
Sobralia macrantha
Saccolabium giganteum
Schomburkia tibicinis
Vanda tricolor
Vanda coerulea
Vanilla planifolia

Cactus Borders.—The two long Cactus borders measuring two hundred and forty yards were cleared of wild growth and then replanted with as large an assortment of succulent plants as was obtainable. These borders are situated on each side of the central entrance which is more frequently used by visitors to the Gardens and, therefore, every effort is being made to make this entrance as interesting as possible by growing in the side borders a large collection of succulent plants which should do well in this arid spot. It is hoped that these borders will be greatly improved when new species of Cacti have been introduced from abroad.

Rose Garden.—Very little progress was made in the work of renewing the rose beds with young plants on account of the extreme drought experienced in 1922. Two beds were cleared, double trenched and then planted with Maman Cochet roses. The collection of selected varieties have grown well with the exception of a few varieties that have failed to do well in the lowlands. Those of exceptional merit are:— Helen Good, Columbia, W. C. Gaunt, Souvenir de President Carnot, and Col. R. S. Williamson.

Two thousand rose plants were imported from America and established in bamboo pots before being offered for sale to the public. If one may judge from the public demand for these plants it is very evident that this enterprise is fully appreciated. The public realise the favourable opportunity which is thus offered to them for introducing new varieties of roses into their gardens. There was a great demand for cut blooms and many thousands were sold during the year.

Fern Rockeries.—Twelve rockeries were cleared and the soil improved by adding loads of farmyard sweepings before replanting again with species of Adiantum and Nephrolepis ferns. All the ferns are now exhibiting masses of luxuriant growth and they present a very cool effect wherever they are situated. Much difficulty was experienced last summer in keeping the ferns alive owing to an inadequate supply of water during working hours.

Labelling Trees, etc.—The work of re-labelling trees and plants about the Gardens is now in hand. Unfortunately very little progress has been made owing to the small amount of money available for this work. Proper labelling of trees and plants adds considerable interest to a Botanic Garden, therefore it is hoped that more money will be available for this work in the coming year.

Repairs.—Plant stands were erected in the Fern House in place of the old structures which had completely decayed. Other minor repairs were attended to when necessary.

Roads and Walks.—The condition of the main drive though the Gardens has reached a stage where only drastic repairs can ever improve its condition. It is quite obvious that this work cannot be under taken by the labour which is now maintained in the Gardens. The walks through the Gardens were all re-surfaced with fine stone obtained from the Public Works stone crusher.

Pastures and Fences.—The work of billing and clearing pasture lands was attended to. Extensive repairs to boundary and pasture fences were undertaken during the past year.

Nursery.—A continuous supply of Economic and Ornamental plants was maintained in the nursery for sale to the general public. We were able to increase our nursery stock by introducing several new varieties of plants that were not previously included in the list of plants for sale.

Plant Houses.—During 1922 a check was put on the indiscriminate sale of plants from the Show Houses as it was noticed that these sales were responsible, to a great extent, for the loss of a large variety of plants. By doing this we have been able to grow on some creditable specimens of ferns and foliage plants which are now helping to make the Show Houses more attractive than they have been for some time. An assortment of flowering plants which maintain a constant show of bloom are grown specially for these Houses.

PLANTS DISTRIBUTED FROM HOPE GARDENS. 1922.

Sold.

Economic Plants:—	
Cocoa	244
Citrus	567
Nutmeg	395
Eucalyptus	261
Misc. Fruit & Economic Plants	1,643
	3,110
Ornamental Plants	18,218
	21,328

Free Grants.

Economic Plants:—	
Cocoa	624
Citrus	3,893
Nutmeg	256
Eucalyptus	30
Cane Tops & Cuttings	426,449
Misc. Fruit & Economic Plants	8,734
	439,986
Ornamental Plants	6,148
	446,134
Total number of Economic Plants	443,096
Total number of Ornamental Plants	24,366
Total number of plants distributed	467,462

The following statement shows the distribution of plants for the last three years from the Nursery at Hope:—

	1922.	1921.	1920 April-Dec.
Cocoa	868	3,862	5,194
Citrus	4,460	4,331	6,318
Nutmeg	651	629	458
Eucalyptus	291	504	386
Cane Tops & Cuttings	426,449	141,547	200
Misc. Fruit & Economic Plants including Timber Trees	10,377	7,970	6,865
Ornamental Plants	24,366	20,207	11,767
	467,462	179,050	31,188

Meteorological.—Hope Gardens, 668 ft. altitude. The mean temperature is 76.2° F and the average annual rainfall is 53.21 inches for 42 years. The mean temperature for 1922 is 78.1° F and the total rainfall was 26.81 inches.

It may be mentioned that the rain fall for 1922 which is 26.4 ins. below the average for 42 years and has been among the lowest records for this period. In consequence, the water supply for the Gardens was inadequate. For several weeks water was obtainable for only a few hours during the day.

The rainfall is as follows:—

1922.	Inches.
January	1.03
February	0.56
March	2.16
April	0.58
May	1.40
June	2.86
July	1.91
August	2.99
September	2.32
October	6.94
November	2.39
December	1.67
Total	26.81

2. Castleton Gardens.

Rosary.—The work of clearing the rose beds of their old bushes which was started last year has beeen completed. The beds have been mulched with all the farmyard manure available and replanted with Maman Cochet and other varieties of rose plants. These are making good growth.

Bougainvillea.—Twelve plants of the 'Ruby' Bougainvillea have been planted in a bed near the nursery. These have made excellent growth and should prove one of the chief attractions when in flower.

Amherstia. The *Amherstia nobilis* again flowered freely and was much admired. Six plants were obtained by circumposition and three of these have been planted out in different parts of the garden. The other three were distributed for trial in different parts of the Island.

Ornamental Beds & Borders. All the ornamental foliage and flowering shrubs were pruned during the year and this was so timed that they should come into flower during the tourist season. The beds and borders were regularly forked during the year and constantly kept in good order; the variety of colour in these is very attractive.

Nursery.—A most important branch of the work at Castleton is the propagation of ornamental and economic plants which are sent to Hope for distribution. The humid climate at Castleton being more suitable for the propagation of plants than that of Hope a large assortment of material is sent every year from Hope to be propagated.

Routine Work.—The usual work of cutting grass on slopes and lawns, re-gravelling walks, removing rubbish, etc., was regularly attended to and the garden was kept in good order throughout the year.

Plants Distributed from Castleton Gardens.

Sold.	
Economic Plants	41
Ornamental Plants	913
	954
Transferred to Hope Nursery.	
Economic Plants	715
Ornamental Plants	26,562
	27,277
Total number of Economic Plants	756
Total number of Ornamental Plants	26,563
Total Number of Plants distributed	27,318

Meteorological.—Castleton Gardens, 496 ft. altitude. The mean temperature is 75.4° F. and the average annual rainfall is 117.80 inches for 49 years. The mean temperature for 1922 was 75.7° F. and total rainfall was 86.09 inches. The rainfall in this Garden was 31.71 inches below the average for 49 years. The rainfall was as follows —

1922.	Inches.
January	8.45
February	8.68
March	4.92
April	6.18
May	4.10
June	6.83
July	5.08
August	11.67
September	10.52
October	9.46
November	5.68
December	4.52
Total	86.09

3. Public Gardens, Kingston.

The appearance of the Victoria Park has considerably improved during 1922. At the end of 1920 the Park had reached such a stage of dilapidation that it was found necessary, when clearing the borders, to cut out all the remaining old bushes and practically start a new garden. This wholesale clearance gave the Park a very bare appearance at the time and, as was to be expected, drew many adverse criticisms from the Public as to its neglected condition. However, time has proved that such drastic measures were necessary if the Park was to be brought up to an attractive standard. The visitor has now the pleasure of seeing masses of flowering shrubs growing in the place of what were once badly neglected shrubberies. Thousands of young plants were required to re-establish the borders. These were all obtained from the nursery stock at Hope Gardens. There are sixteen large borders maintained with a large assortment of flowering shrubs. In addition to these there are many small flower beds about the Park in which Cannas, *Plumbago capensis*, etc. keep up a constant show of bloom at all times of the year.

Goat Nuisance.—Goats and sheep did considerable damage to the shrubberies in the Park during the early part of the year. On many occasions these noxious visitors completely destroyed whole borders of young plants necessitating much extra work in having to renew the borders again with fresh stock and consequently much time has been lost in bringing the Park up to an attractive standard. Stringent measures have since been enforced by the City Police to cope with this nuisance and I am glad to report that the Park is now free from the ravages of animals.

Water Lily Tank.—It was found necessary to take up the whole length of piping which serves to carry away the surplus water from the Tank. This piping was always a source of trouble and expense owing to the roots of trees constantly working their way through the defective joining of the pipes. New pipes were laid down and special care taken to have the joints firmly set in cement so as to prevent the roots from entering again through the joints.

The Lily Tank was emptied and cleared of refuse. A revolving sprayer has been attached to the centre service pipe. This arrangement has proved a great success in keeping the water surface clear of the dust which used to form a scum on the surface before a continual flow of water was maintained.

Walks.—The walks through the Park are in a bad condition. The large number of ruts and big stones in the walks are the cause of great discomfort to pedestrians. There is no material available in the Park for carrying out the work of re-surfacing the walks therefore I can see no alternative than that an extra grant be obtained in order to carry out this necessary work which will not only provide comfort to visitors but also add considerably to the appearance of the Park.

Street Trees and Gardens.—The trees planted along the City streets were kept in fairly good order. There is much difficulty experienced in carrying out the work of cutting back trees along the city streets on account of the Kingston Public Gardens being unprovided with its own transport. At the present time the tree prunings have to be gathered in small barrows and taken to the Park to wait there until transport can be provided to carry the garden refuse away to the public refuse dump. When it is understood that over seven hundred trees along the city streets have to be continually overhauled for low branches it will be quite obvious that considerable time is wasted owing to the lack of transport. The palms and lawns around the Public Buildings were regularly watered and kept in a tidy condition.

Memorial Square.—For three months previous to the unveiling of the War Memorial on November 11th, 1922, considerable extra work was undertaken by the labour attached to the Kingston Public Gardens in connection with the laying out of the grounds surrounding the Jamaica War Memorial. It was found necessary to remove several very old palms and Bougainvillea bushes before the grounds could be re-modelled according to the plans drawn up by the Public Works Department. A great amount of earth had to be levelled off before the lawns could be planted. Four cart loads of Bahama Grass were collected to complete the planting of the lawns. Eight flower beds were opened up in the centre lawns and planted with Hibiscus. There is also a flower bed at each entrance to the grounds in which plants of *Plumbago capensis* have been planted. Extremely dry weather was experienced while this work was in progress, but in spite of such adverse conditions for establishing lawns, etc., the grounds were in excellent condition for the unveiling ceremony. Extra provision has now been made which provides sufficient labour to maintain the Memorial Square in a condition worthy of its origin, "The Glorious Dead."

Meteorological.—Victoria Park, 60 ft. altitude. The mean temperature for 32 years is 78.1° F., and the average annual rainfall for 44 years is 29.79 inches. The mean temperature for 1922 was 79.5° F. and the total rainfall was 6.87 inches. The rainfall in this year was 22.92 inches below the average Mention may be made that the rainfall was the lowest for 44 years.

The rainfall for 1922 is as follows:—

1922.	Inches.
January	0.62
February	0.20
March	1.18
April	0.25
May	0.47
June	2.25
July	0.50
August	—
September	0.90
October	—
November	0.50
December	..
Total	6.87

Hill Gardens.

Planting Trees.—A large number of *Pinus Massoniana* and *Pinus canariensis* were raised from seed received from the Royal Botanic Gardens, Kew. Several free grants of these plants were distributed to persons living in the Hill districts. The remainder are being planted about the Government lands at Cinchona.

Trees and Shrubs.—There are many interesting flowering trees to be seen at the Hill Gardens and therefore much pleasure is afforded to visitors who generally visit these Gardens while they are spending their holidays in the neighbourhood. The most attractive trees and shrubs noticed to be flowering during the year under review were *Gordonia anomala, Eucalyptus ficifolia, Tibouchina semi decandrum, Feijoa Sillowiana, Streptosolen Jamesoni, Rhododendrom,* Azaleas, Acacias and also masses of *Hedychium gardenianum* with its fragrant yellow flowers which made a splendid display during the summer months.

Lawns and Borders.—The terrace lawns were regularly billed and the large lawn mowed with the machine. The rose garden and flower borders were regularly forked and weeded when required. The general appearance of the grounds in close proximity to the house is always maintained satisfactorily, but owing to the small amount of money allotted for the upkeep of the 'Hill Gardens' the nursery lands and woodland walks are unavoidably neglected for several months at a time.

Meteorological.—Hill Gardens, 4,900 ft. altitude. The mean temperature is 62.5° F. and the average annual rainfall is 98.84 inches for 52 years. The mean temperature for 1922 was 62.2° F. and the total rainfall was 44.77 inches as follows:—

1922.	Inches.
January	7.56
February	6.04
March	4.82
April	2.04
May	2.25
June	1.98
July	0.55
August	2.88
September	2.85
October	6.65
November	3.32
December	3.83
Total	44.77

5. King's House Gardens.

The usual operations in connection with the up-keep of these gardens were carried out regularly and a very neat appearance was always maintained about the grounds.

Orchids.—The orchids are in a very healthy condition. Special attention is constantly given to their requirements; potting and careful watering being considered of the utmost importance for the well-being of these choice plants. Several new varieties of orchids received from Hope Gardens were added to the collection. They are all growing well.

Rose Garden.—The rose garden is the most attractive feature in the King's House Gardens. At all times of the year masses of pink and white roses (Maman Cochet variety) are to be seen beautifying this section of the gardens. Large quantities of cut blooms are always available for the Governor's residence. During the year several of the old rose plants died causing unsightly gaps in the beds and owing to the severe drought experienced it was very difficult to propagate a sufficient number of plants to fill up the vacant spots.

Mango Tree.—A very old mango tree growing on the big lawn and which made a very unsightly appearance was cut down and removed.

Kitchen Garden.—Vegetable seeds sown at regular intervals maintained a continuous supply of fresh vegetables for the Governor's household.

Pastures and Fences.—The pastures were billed and cleared and repairs to fences attended to whenever necessary.

6. Gordon Town Garden.

The small Garden at Gordon Town has been taken over by the Public Gardens and arrangements have been made to send a gardener from Hope once a fortnight to do the necessary weeding, etc., that is required.

7. Bath Garden and Nursery (St. Thomas).

Mr. H. G. Coote, Inspector of Plant Diseases for the eastern end of the Island, and who is in charge of this establishment, reports as follows:—

The general routine garden and nursery work was satisfactorily done during the year and the garden presented an inviting appearance and visitors in large numbers, particularly those who visited the St. Thomas Mineral Bath, called daily.

A variety of shrubs was collected and cuttings of Hibiscus and Crotons were supplied throughout the Garden to take the place of old bushes.

A pinery was established and added considerably to the appearance of the Garden. A large number of flowers and ornamental plants were distributed.

Coco .—The demand was slow and a large number of seedlings became overgrown and had to be destroyed.

MONTPELIER EXPERIMENT STATION AND NURSERIES, ST. JAMES.

Mr. Stanley Scudamore, Inspector of Plant Diseases for the western section of the Island, reports on the operations for the past year as follows:—

During the year ended 31.12.22, there has been a large demand for cane plants from the Montpelier Nursery especially for the Uba variety. Owing to the spread of Mosaic Disease and the great difficulty cane planters are finding in controlling this Disease, once it gets on an Estate or cane cultivation, the cane planters are going in for the Uba cane, more and more, and the demand for this variety of cane from the Montpelier nursery was so great that I could supply only about 50% of the orders received. I have arranged to plant out more of this cane at this Nursery to meet the demand for the coming year.

The demand for Cocoa seedlings from this Nursery was very poor and many thousand plants had to be destroyed.

Seven Varietal Experiment Plots were taken off at this Nursery at the beginning of the year, details of which are set out later in report. The figures show the difference in tonnage of various varieties which is interesting. Another lot of these experiments will be taken off in 1923.

A few plots of different varieties planted alternately with the Uba cane were put in for purposes of cross pollination, but owing to the Uba not arrowing, this could not be carried out. Uba arrows were, however, obtained from the northern estates by Mr. Goodman and some cross pollination done at the Nursery.

During the year the following plants were distributed:—

Uba	148,325
White Transparent ..	37,800
B.208	32,350
D.625	22,525
J.72	20,650
B.6450	3,200
	264,850
Cocoa plants	1,460
Total ..	266,310

Nursery Sales.—During the year £34 7s. 2d. was realised for Bananas and Canes from the Nursery.

Rainfall:—

1922.	Inches.	1922.	Inches.
January ..	3.84	August ..	11.88
February ..	3.35	September ..	13.28
March ..	5.10	October ..	6.15
April ..	1.01	November ..	1.27
May ..	10.10	December ..	1.15
June ..	9.65		
July ..	2.65	Total	69.46

RESULTS OF CANE EXPERIMENTAL PLOTS, MONTPELIER NURSERY, 1922.

Plot No. 1. White Transparent, 10 months old Plants, 4'6"x2'. 8.2.22.
50 roots gave 627 lbs. weight
1 " " 12½lbs. "
4,800 " (acre) 26.5 tons " } 26.5 Tons per acre.

Plot No. 2. White Transparent First Ratoons, 12 months old. 4'x4'. 8.2.22.
50 roots gave 1,044 lbs. weight
1 " " 20½ lbs. "
2,700 " (1 acre) gave 24.5 Tons weight } 24.5 Tons per acre.

Plot No. 3. J. 72. 2nd Ratoons, 12 months old. 4'x4' 9.2.22.
50 roots gave 1,345 lbs. weight
1 " " 26½ lbs. "
2,700 " (acre) " 31.9 Tons. } 31.9 Tons per acre.

Plot No. 4. J. 72. First Ratoons. 12 months old. 4'x4'. 9.2.22.
50 roots weighed 1745 lbs.
1 " " 34½ lbs.
2,700 " (acre) " 37 Tons. } 37 Tons per acre.

Plot No. 5. J. 72. Plants 11 months old. 6'x1½'. 8.3.22.
50 roots weighed 1200 lbs.
1 " " 24 lbs.
4,800 " (acre) " 51.5 Tons. } 51.5 Tons per acre.

Plot No. 6. D. 625. First Ratoons. 12 months old. 4'x4'. 15.2.22.
50 roots weighed 2060 lbs.
1 " " 41 lbs.
2,700 " (acre).. 49 Tons } 49 Tons per acre.

Plot No. 7. D. 625. 12 months old. 4th Ratoons 6'x4½'. 15.2.22.
50 roots weighed 2,593 lbs.
1600 " (acre) " 36.5 Tons } 36.5 Tons per acre.

N.B.—125 lbs. of cane from each of these Plots were sent up to the Government Laboratory for testing purposes.

9. Cascade Nursery, (Hanover).

Mr. S. Scudamore reports as follows:—

In spite of the dry seasons this Nursery is doing well and is of great benefit to the district of Cascade.

Seedlings have been planted out from time to time and these have done so well that it has been possible to distribute 12,853 Cocoa plants during the year.

Some Cocoa plants were planted out in the Nursery and these are growing well under the shade of Bananas planted for that purpose. As a result many persons have laid out small Banana plots part as shade for Cocoa plants, and several others are preparing lands for the Spring.

10. Cornwall Nursery, (Westmoreland).

Mr. S. Scudamore reports as follows:—

During the Fall of the year 1922 there was a great demand for cane plants from this Nursery in contrast to last year when there was no demand at all for plants. Practically all plants grown were distributed and 3 new plots were planted out in the Nursery itself and these have grown very well, so that with the exception of about ¾ of a plot the whole Nursery is established in cane. This ¾-plot I should like to plant out in the Spring of this year with new seedling varieties from Hope.

The number of cane plants distributed during the year is as follows:—

D. 625	14,935
J. 72	4,000
B. 208	19,310
Uba	20,270
Total	58,515

Nursery Sales—Cane to the value of £10 19 1½d. was sold during the year.

11. Summary of Plants Distributed during the last Three Years.

	1922.	1921.	April-Dec. 1920.
Cocoa	15,181	45,432	10,069
Citrus	4,460	4,331	6,318
Nutmeg	651	5,761	458
Eucalyptus	291	504	386
Cane Tops & Cuttings ..	749,814	198,605	200
Misc. Fruit & Economic plants including Timber Trees	11,133	12,683	10,402
Ornamental Plants	50,928	36,352	22,636
	832,458	303,668	50,469

The Garden and Plantation Sales for the past three years have been as follows:—

1922	£456 2 8
1921-22	516 4 8
1920-21	481 5 4

M. S. Goodman,
Actg. Superintendent Public Gardens.

III. Agricultural Experiments.

Annual Report of Superintendent of Agriculture for 1922.

Sir,

I have the honour to submit the annual Report of my work as Superintendent of Agriculture for the year ending December, 1922.

2. This work may briefly be divided under the following heads and subheads:—

Sugar Cane work—including experimental work with different varieties of canes.

Manurial Experiment with fertilizers in connection with Cattle Pen Manure, Lime and Ashes.

Testing and distribution of New Seedlings from the Montpelier, Cornwall and Danks Cane Nurseries.

The treatment of imported bulls with trypan blue for tick fever.

The erecting of Dipping Tanks and finally serving as a Commissioner in the control of Foot and Mouth Disease in the Western Parishes for six months of the year, under the control of the Department of Agriculture and then under Mr. Conacher the expert from England, and finally with Dr. S. Lockett and his Advisory Board.

3. *Canes.*—Manurial Experiments have been conducted on the following Estates laid out on the lines adopted last year which were as follows:—

Plot. 1. No manure.
2. Nitrate of Soda 2 cwt. per acre
3. Sulphate of Ammonia, 2 cwt. per acre
4. No manure
5. Nitrate of Soda 2 cwt. per acre followed by Sulphate of Ammonia 2 cwt. per acre.
6. Nitrate of Soda 2 cwt. per acre followed by Nitrate of Soda 2 cwt. per acre 4 months later.

7. No manure.
8. Sulphate of Ammonia 2 cwt. per acre and Sulphate of Potash 1 cwt. per acre.
9. Nitrate of Soda 2 cwt. per acre **and** Sulphate of Potash 1 cwt. per acre.
10. No Manure.
11. Sulphate of Ammonia 2 cwt. per acre & Sulphate of Potash, 2 cwt. per acre.
12. Sulphate of Potash 2 cwt. per acre.
13. No Manure.
14. Cattle Pen manure 30 loads per acre
15. Lime 10 cwt. per acre
16. No Manure.
17. Ashes, 1 qrt. per root.

It will be noticed that the three kinds of artificial Manures, Sulphate of Ammonia, Sulphate of Potash, and Nitrate of Soda which have been found to give results on the Cane lands of Jamaica, have been included in this series of Plots, both singly and in conjunction with each other in various proportions, as has also been added the ordinary Estate manures, cattle pen manure, lime and ashes. It will also be noticed that besides each manure plot there is a check plot of No manure, for the purposes of comparison.

Phosphate manures have been omitted as we have found after years of experimental work that they give no increased tonnage on our lands.

3 Estates Conducting Experiments in 1922.

Trelawny	Long Pond (Hyde Hall Farm)
	Georgia
	Swanswick
	Orange Valley
St. Ann	Richmond
Vere	Amity Hall
	Pusey Hall
	Bog
St. Catherine	Bernard Lodge, (three sets)
	Worthy Park (six sets)
St. James	Catherine Hall
	Bogue
Westmoreland	Blue Castle
	Sweet River
	Friendship

Varietal Experiments were put in the following Estates:—

Vere	Amity Hall
St. Catherine	Worthy Park
St. James	Catherine Hall
Trelawny	Hyde Hall

N.B.—These have not yet been cut.

4. I attach a complete Report on each of the Estates conducting Experiments and have made an analysis of the results in each case. In view of the unavoidable unevenness of the most perfect field, I have decided to rearrange the manurial experiments so that there will be three plots in each experiment, of the same application, with check plots from which an average will be taken. This will lead to more correct deductions and ensure greater accuracy.

Long Pond.—Analysis of experiment show that:—

1. Sulphate of Ammonia or Nitrate of Soda alone give no result.
2. That in combination with Potash the tonnage is in every case increased.
3. That Potash whenever used has given an increased tonnage.
4. That Ashes in every case give an increased tonnage.
5. That Cattle pen manure has in both instances where used paid handsomely. It is clearly indicated by this experiment that Potash is the weak element in this soil and should be applied more extensively than hitherto.

Georgia.

Analysis.—This experiment was conducted in 1921 and repeated in 1922, so that the same application was given to each plot as in the previous year.

It is noticeable that Nitrate of Soda is the most valuable of the manures tried, and that in combination with Potash the yield of Cane is considerably increased.—Plots 1, 6, and 7.

Sulphate of Ammonia does not pay its expenses—Plots 3 & 4, nor does its combination with Potash show much better. Plot 9.

The soil of this piece being of a light nature heavily mixed with marl, it is to be expected that Sulphate of Ammonia would not be a success on this land. The Attorney and Manager of this Estate has very wisely decided to use Nitrate of Soda and Potash extensively in the manuring of his land.

Swanswick—Manurial Experiment.

Deductions.

1. *Nitrogen.*—The results clearly indicate the necessity of Nitrogen either in the form of Sulphate of Ammonia or Nitrolim. A double application is not followed by any increased yield of Cane and is undesirable.

2. *Potash.*—This is not an essential in this field.

3. *Ashes, Lime and Marl.*—These do not appear to be necessary. Plot 22 is an exception to this. I however do not attribute this to the Ashes, but to the improved condition of the soil at this point.

4. *Dung.*—The response is immediate and in proportion to the application—Cattle Dung was preferable to Sheep Dung.

5. *Forking.*—This has resulted in an increase of 2.2 tons to the acre. Its effect, however, will be probably more felt in the second than the first year.

Orange Valley.—The field in which this experiment was conducted was most irregular. It was supplied but on account of the dry weather the supplies did not grow.

The results I consider valuable as they indicate the lines along which further experimental work should be conducted. For instance Lime should be further investigated as the indicated yield, Plot 15 of 18 tons compared with the No manure Plot adjoining it, of 11 tons is promising of further profitable investigation.

Plot 8—Nitrate of Soda and Potash yielding 20.4 tons with an increased tonnage of 4.6 tons over the No Manure Plot adjoining it is in accord with results from other parts of Trelawny on soils of this nature.

It is found that almost without exception Nitrate of Soda is preferable to Sulphate of Ammonia on red soils and is far more reliable.

Chesterfield—Amity Hall,
H. Walcott, Esqr.,

The results indicate that, Nitrogen is desirable as an application 2 cwt. per Acre.—Plots 2 & 3 (Nitrate of Soda and Sulphate of Ammonia) and an average increased tonnage of 5 tons per acre may be expected under irrigation conditions. A double application does not result in an increased yield;

that Potash is not necessary;

that Lime is highly essential either in the form of slaked lime or Ashes, preferably Slaked Lime, from which an estimated yield of 8.5 tons per acre is shown;

that Cattle Manure is disappointing, but results may be expected to follow in the second and third years from application.

Pusey Hall,
R. Campbell, Esq.,

The results of the experiment would point to the value of Nitrogen, either in the form of Nitrate of Soda or Sulphate of Ammonia. Plots 2, 4, 5 & 6, in which these Manures were used have given an increased yield of 3.6 tons per acre.

It is noticeable that a heavier application than 2 cwt. per acre is not to be recommended.

Potash does not appear to be necessary.

Lime Plot 15 gave an estimated increase of 2 tons per acre.

It is noticeable that the results are identical with those obtained at Amity Hall and show the soils of Vere to be responsive to Nitrogen and Lime.

Bernard Lodge.—Three sets of experiments were tried on these Estates on three different types of soils. It was hoped to determine the value of Lime as a heavy and light dressing and the response of the Soils to an application of Sulphate of Ammonia and Potash in proportions of 2 and 1.

Due to the unevenness of the fields as a result of gall patches (the reason of which it is difficult to determine) the results are so uneven that no conclusions can be drawn from the experiment, which must be considered abortive.

Worthy Park.—A series of 6 sets of experiments were conducted on this estate on three different classes of soils typical of the soils of the estate. These experiments were planned after careful consideration of the results of our experimental work the previous year.

I attach a summary of the six sets in combination and have also given in details each set with an analysis of each.

The following general conclusions may be made from the results of this work:—

(1) Lime is necessary to the soils applied at the rate of one ton per acre. An excess application does not pay its expenses.

(2) Sulphate of Ammonia is necessary giving an increase of from 3 to 8 tons per acre.

3) A combination of Lime and Sulphate of Ammonia though giving an increased yield does not pay for the extra cost over the simple application of Lime or Sulphate of Ammonia alone. It would appear to be advisable to apply the Lime one year and follow up the succeeding year with Sulphate of Ammonia.

(4) Nitrate of Soda gives an increase of from 3 to 6 tons per acre when used in combination with ashes and forms a useful application.

(5) Potash alone or in combination with Ammonia does not pay its expenses.

(6) Bat manure in one plot tried on Bamboo Walk appears to be useless.

Worthy Park.—

Bottom Pasture.—

2nd *Range 4th Piece.*—The object of this experiment was to determine the values of Sulphate of Ammonia, Nitrate of Soda, and Potash on soils of this nature, which is that of a heavy red clay, in rolling country.

From the results it is evident that a combination of Sulphate of Ammonia 2 cwt. and Potash, 1 cwt. per acre is most suitable to these soils. A repetition of this experiment is desirable to further check this. Potash alone or Ammonia alone does not pay expenses.

Worthy Park.—

Bottom Pasture.—

No. 2 Range, 3rd Piece.—The object of this experiment was to determine the relative values of Sulphate of Ammonia and Lime, separately and in conjunction with each other—Sulphate of Ammonia being applied after Lime with an interval of three months between.

From the results it must be concluded that both Lime and Ammonia are necessary, but their application together does not result in an increased tonnage. For instance Plot 8—Ammonia alone gives

an increased tonnage of 3.9 tons per acre, while in Plot 13 Lime alone gives an increase of 3.5 tons per acre, and in Plot 12 Lime and Ammonia give an increase of 3.4 tons per acre.

It would therefore appear to be expedient to apply Lime the first year and follow it the second year with Sulphate of Ammonia.

Worthy Park.

Bam oo Walk.

No. 1 Range, 2nd Piece.—The object of this experiment was to determine the value of Lime and Ammonia separately and in conjunction with one another, applied after an interval of 3 months.

It is regrettable that owing to heavy winds the canes of the heavier plots were blown down and a considerable loss occurred, so that no reliable conclusions are to be drawn from this experiment.

Worthy Park.

Bamb o Walk.

No. 1 Range, No. 3 Piece.—The object of this experiment was to determine the relative value of Sulphate of Ammonia, Nitrate of Soda and Potash.

A plot of Bat Manure was also included, this manure being available on the estate.

It is regrettable that due to heavy winds the canes of the heavier plots were blown down and a considerable loss occurred so that no reliable conclusions can be drawn from this experiment.

Analysis of Experiments—(Manurial.)

Fig. Tree, No. 1—Range 2.—The object of this experiment was to determine the value of Ammonia, Potash, and Nitrate of Soda on these soils.

The results indicate that Ammonia is highly necessary as indicated in Plot 4, which gave an increased tonnage of 8.2 tons per acre over the average of the No Manure Plots on either side of it. This gave a profit of £6 2/ per acre after paying expenses.

Nitrate of Soda.—Though giving a high return—6.8 tons per acre, this manure is apparently not as suitable as Sulphate of Ammoina.

Potash.—This manure does not appear to be necessary.

Worthy Park.—

Fig. Tree No. 2—Range 2—The object of this experiment was to determine the value of Lime and of Ammonia separately and in conjunction with one another, applied after an interval of 3 months; also to determine the value of ashes and Potash.

The results indicated that Lime and Ammonia are both highly necessary and that the most suitable application in Fig. Tree No. 2 Range 2 is that of Lime ½ ton, followed three months later by Ammonia, 2 cwt. per acre. This application gave an increase of 6.5 tons per acre and a profit of 68/ after paying for the Ammonia and Lime.

Sweet River.

This experiment indicates that Nitrogen either in the form of Nitrate of Soda or Sulphate of Ammonia is necessary; that Potash is also necessary and would pay expenses and give a profit.

A combination of Sulphate of Ammonia and Muriata of Potash is to be recommended in the proportion of 2—2 making an application of 4 cwt. per acre which gave an increased yield per acre (in plot II) of 7.1 tons with a profit of £3 16/, after deducting the cost of the application.

Lime is apparently not necessary from the results of the cutting of the first year of application. Experience proves, however, that the effect of Lime is more felt in the second year after application.

Cattle dung has given an increase of 3.2 tons per acre, which would be unsatisfactory if the value of this application were not felt for a period of years after application.

Catherine Hall.

The object of this experiment was to determine the value of various artificial manures applied to the same field two years in succession, with the exception of Lime and Cattle Manure the effect of which it was desired to know the second year after application.

The results indicate:—

1st.—The value of Lime which gave an increased tonnage per acre of twelve tons.

2nd.—The importance of Nitrate of Soda—Plots 2, 6, 8, and 4 giving increases of 9, 12, 9 and 12 tons per acre respectively.

3rd.—The reduction in tonnage where Sulphate of Ammonia is used, Plots 3 and 5.

It is evident that Nitrate of Soda is much superior to Sulphate of Ammonia, and that Lime is necessary to soils of the class of middle piece.

Bogue Estate.

The results of this experiment are so irregular that no definite conclusions can be drawn from it. For instance Plot 12 points to the value of Sulphate of Ammonia and Sulphate of Potash in proprotion of "two to two" with an application of four cwt. per acre resulting in an increased tonnage of 7.5 tons per acre. This is however contradicted in Plot 9 which had the same manures with a slightly less proportion of Potash. No increased yeild whatever resulted from this application.

Similarly Plot 15—Ashes and Nitraate of Soda, show an increased yield of 10.8 tons per acre, but this is not supported in plot 16 where ashes alone was applied, nor in plots 2 and 6 where Nitrate of Soda alone was used or in plot 8 where Nitrate of Soda and Potash were used.

Cattle Manure too is disappointing only resulting in 1.9 tons per acre and costing £5 per acre for application.

5.—Varietal Experiments.

A complete series of 17 varieties of canes repeated on four principal estates in different centres of the Island have been put in. These canes have not yet been cut at the time of writing.

Varietal Tests have been made at Danks, Cornwall, and Chapelton Nurseries the full report of which are attached. Briefly these results indicate the value of the seedling J.72 as compared with the White Transparent, D.625 and B.208.

Montpelier Nursery.—Seedling J.72 stands out ahead of all others both as a plant, giving 10,753 lbs. of sugar per acre, and as a First Ratoon giving 9,599 lbs.

The White Transparent which is our standard of comparison only yielded 4,957 lbs. as plants. This plot, however, was two months younger still there is no comparison between the two canes in this instance.

Danks Nursery.—It is highly interesting to note that at this nursery J.72 has again proved its value giving 7,096 lbs. of sugar per acre as compared with B.208 giving 5,596.

Cornwall Nursery.—The B.208 came out in this instance ahead of J.72 with a sugar yield of 6,054 lbs. per acre, the J.72 yielding 5,268 lbs. D.625 is not in the same class with either of these canes only giving 2,767 lbs. of sugar per acre, from 50 to 60% less than the others.

6.—Trypan Blue.

On two occasions I was requested by Mr. George Dewar to go down to Harmony Hall and treat his imported Angus Bulls for tick fever. I am pleased to report that on both occasions the animals answered to the treament and recovered immediately after an intravenous injection of Trypan Blue.

7.—Dipping Tanks.

I was interested in the erection of the following Dipping Tanks during the year, either directly during the operation of building or after in the charging or inspection of the tank.

Irwin	Dr. Mills
Barneyside	Mr. David Mills
Roehampton	Mr. A. Thomas
Morgan's Valley, Temple Hall	Mr. A. Soutar
Brumalia	Mr. A. Lewis
Eden	Mr. John Lynch
Pepper	Mr. A. Lewis
Seven Rivers	Lindo Bros.
Caymanas	Mr. Crum-Ewen
	Mrs. Addison
George's Valley	Mr. A. Gray

8.—Foot and Mouth Disease.

In July I was appointed a Commissioner under the Contagious Diseases of Animals (Inland) Law for the western parishes which position I still hold. The work done may briefly be classified as follows:

The supervision and maintenance of disinfecting stations.
The payment of employees
Control of the disease involving constant visits to actually infected places
Investigation of reported outbreaks
Services of notices on infected and suspected places
Collection of statistics
Visiting the locus in quo for desired movements
The giving of instructions in the general care and control of sick animals
Assisting in the prosecutions for offences against the regulations
Disinfection of Infected premises
Control and distribution of disinfectant and other duties connected with the straying of Small Stock on the public highways.

I have the honour to be,
Sir,
Your obedient servant,
P. W. Murray,
Supt. of Agriculture.

Report of Plant Breeder.

Sir,

I have the honour to submit my report on the experiment station for the year ending December, 31st 1922.

Drought and Water Supply.—The past year was an exceedingly trying one and was the driest year on record for the past forty-nine years. The water supply is not sufficient to maintain the large area under irrigation and it will be seen that the task of keeping everything in a flourishing condition during frequently recurring and protracted periods of drought is hopeless with the limited supply of water at our command. And, during times of drought, when the Hope River is low, our inadequate supply is still further reduced.

Canes.—The demand for tops has been very great this year and although experiencing such a prolonged drought we have been able to distribute a record number of cuttings. A total of 426,449 tops and cuttings were distributed. This is more than double the number distributed during any one year in the past. Several fields of old ratoon canes have been replanted. The old stools were dug out, the fields ploughed and cross-ploughed, trenched, and replanted with Uba and other promising seedling varieties.

Some of the varieties of seedling canes received from Barbados the previous year are very promising and some have already been distributed.

No Mosaic or Mottling Disease of the sugar-cane has been seen in the station this year so we can now confidently say that we are free of this disease.

All the fields have been kept free from grass and weeds which were to some extent responsible for the continued infecting of newly planted fields in the past with the Mosaic Disease. It is, to some extent, now definitely decided that this disease is insect borne and that certain grasses are susceptible to the Mosaic of sugar-cane and that it is transmitted from cane to grass and vice-versa. On my visits to a number of estates I have noticed that when a clean cultivation is maintained there is very little Mosaic Disease occurring.

Owing to the irregularity of the flowering of the Uba and other varieties at Hope last year it was impossible to obtain any crosses and fearing that this would be the case again this year circulars were sent to a number of proprietors of sugar estates on which the Uba cane is grown asking them to let us have any inflorescences that were available for crossing with other varieties, and I would like to mention that all of them replied offering all assistance possible to further the work, which was greatly appreciated. But owing to the Uba at Hope flowering at the same time as the other varieties it was not necessary to go to the estates for these inflorescences.

Crosses between the White Transparent and Uba were made at Montpelier Nursery. The White Transparent flowered freely and was used as the female parent but there being no Uba inflorescences there these had to be obtained from Rose Hall Estate, the property of Mr. A. Henderson. A number of crosses were made at Hope with the following varieties:—

White Transparent	x	Uba
D 117	x	White Transparent
D 117	x	B. 6450
White Transparent	x	B 7924
D 117	x	B 295

The seeds of some of the crosses and other varieties were sown in boxes in the open but the excessive heat and high winds prevailing then dried out the moisture so quickly that a poor germination was the result. The remainder of the seed has been sown in boxes under glass and the germination of these has been much better.

It is not at present possible to give the number of seedlings that are likely to be obtained as these are still in boxes and all have not yet germinated. When sufficiently grown they will be pricked off in bamboo pots and later a first selection will be made and planted out in the field.

The experience gained this year with regard to the germination of the seed will be very beneficial in the future.

Pines.—The Pinery has now been increased in area to 1½ acres. The amount realised from the acre planted in the previous year was over £60. This would have been higher but nearing the end of the season several were lost owing to being attacked by a fusarium making them unfit for use.

Guavas.—The old Guava Plot which was originally planted six feet apart was too close and every other tree has been taken out to give them more space for development.

Mangoes.—The mangoes along the station borders which had died out have been replanted. These, although hand-watered, made poor growth owing to the severe drought. All the trees along the borders have been budded with the Bombay but several failed to take owing to the reason given above.

Cotton.—The Cauto Cotton suffered severely from the drought. It was severely attacked by leaf blister mite and scale insects. The trees were dug up and burned.

Grasses.—The Wynne Grass (*Melinis minutiflora*), the seed of which was presented to the Department by Mr. Walter Wynne, has proved to be a good drought resister and should prove successful in the dry districts of the Island. A quantity of seed of this grass has already been distributed as well as some roots. It grows so profusely that it is almost impossible for any other grass to grow with it. We now have the following grasses which we propose to plant out in half-chain plots in comparison with the Guinea grass which does so well in these low lands:

Wynne Grass
Soudan Grass
Rhodes Grass
Elephant Grass
Teff Grass (*Eragrostis abyssinica.*)

Cocoa.—During the year under review the usual pruning was continued. Intercultivation was carried on between the young trees set out last year and with the addition of some stable manure they are doing very well. A few trees that suffered from die-back owing to soil condition were successfully treated and are now showing a healthy condition. The Easter crop was a large one of good-sized pods and beans, much better than the crop reaped in the fall which suffered adversely from the protracted drought. Irrigation had to be continued throughout the year whenever water was available.

Coffee.—The trees were made bare of berries at the end of January to give time to prepare for the crop reaped during the year. This crop was a fairly heavy one but quite 25% of it went light occasioned by the severe drought. The usual pruning was carried out during the early part of the year and the plot was cultivated. The young trees set out last year have been treated with stable manure and are doing well. The "long-top" coffee which enjoys a better supply of shade has again given a large crop. I have been able to utilize the surplus water from the lily ponds to irrigate at least the upper

section of this plot and as a result, despite the very severe drought, the trees show a comparatively flourishing appearance.

Banana.—The banana plot has been pruned, cultivated and mulched during the year. A vigorous campaign against banana borer has been kept up throughout the year and the plot is now almost free of these pests. Owing to the extension of the Mango Grove this site is becoming unsuitable for the best results to be obtained and consequently a new plot was established during the month of October. This plot is aptly situated for irrigation and the young trees are thriving well.

There are three seedling bananas now growing in the school garden from the seeds obtained from West Africa.

During the latter part of the year I experimented on the "Dwarf Banana" by picking off the navels from the 'fingers' as a preventative of the rot to which this variety is so accustomed. I am glad to report that the experiment has been very successful.

Cassava.—The Cassava plot has given place to Uba canes and a small plot has been established in the school garden comprised of five varieties and consisting of Trinidad No. 15 (sweet,) Jamaica White Stick (sweet), Bobby Hanson (bitter), Malta Hotel (bitter) and Sellier (bitter.) Owing to the drought I have not yet been able to test their bearing qualities.

Citrus.—Owing to regular cultivation the trees are all showing an improved appearance. A few of the older trees have been pruned and spraying for the Black Fly has been continued. A few of the Seville Orange trees that were budded with Navel Orange have been successful. All the young Seville Orange seedlings set out have taken and these will be budded on during the year with a view to having the Grove completed.

Grapes.—These were pruned in February and again lightly in August. This has been a departure from the usual practice of pruning only once per annum. It however resulted in two average crops. Spraying with Bordeaux mixture was continued throughout the year. Both crops suffered from the Black Spot but quite a large percentage did not suffer.

School Garden.—The new School garden has been kept up by the students and presents a very tidy appearance. The following vegetables are cultivated:—Banana, plantain, canes, pines, cassava (bitter and sweet), garden egg, tomatoes, cabbage, turnip, okra, peas, sweet potato and pepper.

Agricultural Education.—The students of the Farm School were given instruction in the above mentioned crops for five days per week. They have also done practical work in forking, ploughing, cultivating, mulching, irritating, manuring, budding, and grafting, fermenting and curing of cocoa and coffee, and in the preparation and application of fungicides and insecticides.

Mr. L. A. Powell, the Master in charge of the students in Practical Agricultue, has taken great interest in this part of the work and there has been a great improvement with the crops under his charge

H. S. Goodman,
Plant Breeder.

Report of Industrial Chemist.

Government Laboratory, Hope, Kingston P.O.,

January 19th, 1923.

Sir,

I have the hinour to submit my Annua l Report for the year ending December 31st, 1922.

2. *Pimento Oil.*—During the week ending 25.2.22, special experiments were conducted with a view to testing out the new pipe still and to ascertaining the maximum amount of oil that could be distilled each day. The experiments were conducte dbetween 6 a.m. and 6 p. . during which time two runs were made. When fresh green leaves are used, 500 lbs. fill the still to capacity, but as they lose moisture, the amount required is reduced. The weights 415–441 lbs. given in the table below are all taken as approximating 500 lbs.

Day.		Wt. Leaves.	Yield in c.c.	Yield lbs.	% in lbs.	Phenol %
1st	..	500 lbs.	2,030	6.25	1.25	61
	..	500 "	1,780	4.00	.80	65
2nd	..	415 "	1,820	4.00	.80	77
		444 "	2,125	4.75	.95	87
3rd	..	441 "	2,060	4.75	.95	91
		442 "	2,080	5.00	1.00	88
4th	..	443 "	2,235	5.25	1.05	90
		440 "	2,130	4.75	.95	93
5th	..	441 "	2,525	5.75	1.15	89
		443 "	1,945	4.50	.90	37
6th	..	438 "	2,520	5.75	1.15	91
		441 "	2,190	5.00	1.00	91
	Tota. ..	4,388 lbs.	21,630 c.c.	59,751 lbs.	Avg. 996 lbs.	Avg. 88.1%

Total available Eugenol, 50.86 lbs. Eight cords of wood were used during the week.

(b) It is evident from the table above that a cord of wood distils about 7.47 lbs. of oil containing about 6.4 lbs. of available Eugenol. The first day's runs were made from Walderston leaves, and the

first of the second day's run consisted of a mixture of Walderston and Grove Place leaves. All the other leaves were from Grove Place, while all the leaves used in the experiments were from female trees.

(c) The weight of crude oil on hand up to November lst was 179 lbs. On the 23rd of the same month 150 lbs. of oil containing a Phenol content of 97% were prepared and delivered for shipment to England.

3. *Tannin Experiments.*—The extraction experiments were conducted on exhausted leaves. The cold water method of extracting the tannin proved tedious, long and inefficient. Six pounds of leaves were placed in each of eight kerosene tins connected in series and thirty pounds of water added to the first tin. It was hoped that a fair extraction would have been effected in twenty-four hours to permit of the solution being drawn off and enough water added to overflow into tin 2— this operation to be continued to the eighth tin. At the end of that time, however, the water was barely tinged. This fact showed that no useful purpose would be served by drawing off the solution at the end of twenty-four hours and so it was allowed to stand for two weeks. It was analysed for tannin and showed only a trace (.031% by weight). A check experiment was conducted on unexhausted leaves and identical results were obtained. One tin charged like the first was allowed to stand for nearly three months— June 26th to September 21st, with daily stirring. Analysis of the solution showed only .141% of tannin.

(b) When hot water is used, or when the leaves are heated up in water to a temperature of 90-100: C for seven oreight hours, the extraction of the tannin is practically complete. This solution on analysis had as high as 18% of tannin. Unless, of course, these dried leaves could be used as fuel in the extraction, the method would prove expensive in the end.

4. *Tanning Experiments.*—In order to ascertain the kind of leather the pimento leaf tannin gives, three kinds of solutions were tried out on rat, mongoose, and goat skins. Solution was obtained by cold water extraction; solution 2 was obtained from the still after the oil was extracted from the leaves; and solution 3 was obtained by heating up one pound of leaves in two gallons of water to a temperature of 90% C for seven hours. The evaporated water was replaced from time to time.

(b) Solution 3, which had a tannin content of 16.2% gave jet black leather in twelve hours. Solution 2 (13.5%) tannin) gave black leather in about eighteen hours. The skin remained a beautiful brown after standing in soluton 1 for as long a period as two months, but on removing and drying it, it became as black as the others in about three days. The leather obtained in each case was found to crack and tear readily in spite of the fact that it was oiled thoroughly.

(c) A visit to the Thorburn Leather Factory, and a talk with Mr. Thorburn confirmed the results obtained in the Laboratory. He informed me that it was never found practicable to use pimento leaf tannin exclusively in leather tanning. It might be used in the proportion of 15% to 85% of divi divi or mangrove tannin. Apart altogether from the difficulty of extracting this tannin by means of cold water, the Laboratory results do not appear to warrant its exclusive use as an efficient tanning material.

5. *Motor Spirit.*—On the 25th of April last thirty-one gallons of motor spirit were prepared and delivered for tests in motor trucks. This spirit was prepared from a puncheon of common clean rum containing 79.09% of alcohol by volume. The results of the tests have not been recieved.

I have the honour to be,

Sir,

Your obedient Servant,

(Sgd.) E. E. A. Campbell,

Industrial Chemist.

IV.—SISAL PLANTATION AND FACTORY, LITITZ.

The factory was erected and the water-works completed by the end of the year. Great difficulties had to be faced due to the remoteness of Lititz for the transport of the materials and machinery while the serious drought and absence of water caused a cessation of work on the catchment and reservoirs and on the concrete work of the factory for several months.

The transport problem was solved by the purchase of a White $3\frac{1}{2}$ ton truck. This did an immense amunt of service in the transport of machinery and supplies and the delivery of marl to the reservoir site. The Honourable A. G. Nash, who gave his services free, acted as Engineer for the water-works. The original design for two reservoirs each of 200,000 gallons capacity was abandoned owing to the hard rock at one of the sites and Mr. Nash designed one large reservoir with a capacity of 370,000 gallons. The catchment area was reduced from 4 acres to 3 acres for financial reasons. The three-inch main was laid along the Parochial Road to the site of the factory. This water supply is quite satisfactory. Ten inches of rain per annum meet the minimum requirements of the factory and the reservoir is capable of supplying the factory for 6 months when filled to capacity. The average rainfall is over 40 inches per annum. An inch of rain supplies 60,000 gallons of water in the reservoir. This catchment is a splendid asset to the factory and, indeed, to this waterless district.

Owing to the high cost of cement and materials and, doubtless, to some lack of experience on the part of the Depaatment of Agriculture which had been called upon to carry out a "Public Work" costing £27,000, the cost of the Lititz water works was rather higher than we had expected, although ttill much below the original estimate of the Public Works Department which the Lititz Board declined so accept. Delays arose over the erection of the factory building due to the supply from England of

the wrong size of bolts for fastening the zinc roof and the necessity for altering the design of the factory to permit of the Megass trucks standing beneath the decorticator. The English designers had expected that the factory would be served with a sluice and that the Megass would be washed away into a river. At Lititz it is vital to the success of the enterprise that all the Megass be returned to the fields so that the fertility of the arid Savannah waste may be steadily built up to a good standard of fertility.

Troubles also arose with the machinery. The baling-press supplied was useless for dealing with Sisal and had to be greatly enlarged. Further alterations will be necessary to have this machine put on a proper basis.

The Robey Engine has also given a good deal of trouble, attributed to ill-advised alterations of the manufacturers original adjustments by the erectors of the engine.

The Robey Decorticator has given splendid results and is considered by experienced persons to be the most efficient machine yet tested in Jamaica for decorticating Sisal leaves.

The factory started operations on the 1st December, but owing to the troubles previously referred to its work was spasmodic, causing higher overhead charges than normal.

Owing to the severe droughts of 1920 and 1922 the Sisal of 4 years old was greatly retarded and of the 363 acres expected to be ready for reaping less than 200 acres was fit for harvest. The state of the plantings is as follows:—

Sisal 4 years old	363 acres
" 3 years old	160 "
" 2 years old	106 "
" 1 year old	354 "
New plantings	148 "
Total	1,141 acres

As soon as the present crop of good leaves has been decorticated it will be necessary to shut down the factory for several months until the plants have grown to proper size so that the factory can be operated on an adequate scale.

It is evident that our factory can easily deal with the Sisal from 2,000 acres and that to work it to capacity the public must contribute about 900 acres of Sisal to the factory.

A weigh brid ge has been ordered and this will enable the trucks of leaves to be weighed and the factory operations recorded on a "ton" basis.

Electric light has been installed so that it is possible to work at night. The gasoline locomotive has given good service and the tram line has been of great use. It will be necessary to extend this and to add a second loco to our establishment.

Arrangements were made for washing the fibre in two parallel series of three concrete tanks. The drying ground is of ample extent and consists of round galvanised wire (double) stretched on hardwood posts 4 feet high.

The "No. 1" quality fibre proved to be of excellent quality. Samples were sent to London and New York and eventually we were able through the business efficiency of the Crown Agents to secure the top price of the market, viz: £37 10s. 0d. per ton, C.I.F., New York, for a lot of 50 tons of this fibre.

Besides the "No. 1" three lower grades of fibre are also being classified. At the start of a new factory a good many over-ripe leaves have to be dealt with which give an inferior fibre. This class of fibre is kept separate and will be sold at a lower figure than the "No. 1" and "No. 2" grades which are clean, washed and brushed fibre free from blemish.

We were fortunate in being able to purchase a house near Lititz with 50 acres of land as a residence for the Supervisor. This saved £1,000 over the estimated cost of a new residence to be built by the Public Works Department and as the 50 acres has been planted up with the young Sisal plants removed when the tram line was laid, we have secured a valuable addition to the plantation.

The enterprise was operated on a "Working Account" as from the 1st April, 1922. For the first year no revenues had been realised and the total expenditure amounted to £1,913.

A financial statement of the Capital Expenditure and of the "Working Account" is appended to this report.

The Board of Management was kept in touch with the enterprise by circulation of papers. Three meetings of the Board were held during the year.

Apart from the financial aspect of this experiment, which is considered to be assured, the social advantages to the people of Lititz have been most marked.

Starvation and want would have been rife but for the new industry of Sisal Fibre, for these people have had no wage-earning occupation hitherto and when their small crops of foodstuffs and tobacco failed during periods of drought their resources were ended.

As Chairman of the Commission of 1909 which enquired into this distressed area of the Island and recommended the establishment of drought-proof industries, I am pleased to see a concrete demonstration of the benefits accruing frrom the introduction of the fibre industry at Lititz and the proof of the high quality of this valuable staple that can be produced on these arid, limestone lands.

CAPITAL EXPENDITURE, LITITZ SISAL FACTORY.

Particulars.	Original Estimate.		Actual Expenditure to 31.3.23.	
	£		£	
Buildings & Equipment—				
Factory	2,247		2,829	
Workmen's Building P.W.D.	1,733		2,110	
Do. Do D/Ag. ..	600		352	
Garage & Loco, Shed ..	..		277	
Manager's House ..	1,500		576	
Fencing for Drying Ground	380		666	
Furniture	810		246	
Water Supply	8,055		5,584	
Total ..		£15,325		£12,640
Machinery & Equipment:—				
Factory	6,117		7,973	
Locomotive	1,100		632	
Waggons	900		794	
Rails	3,130	£11,247	2,417	£11,807
Construction Charges:—				
Personal Emoluments ..	..		603	
Transportation	268		1,382	
Surveys & Miscellaneous ..	160		474	
Totals		428		2,459
		27,000		26,906
Net Balance available		..		94
		27,000		£27,000

LITITZ FIBRE PLANTATION AND FACTORY WORKING ACCOUNT EXPENDITURE TO 31.3.23.

Plantation:—			
Weeding and Cleaning	£485		
Planting	297		
Supervision	131		
Supplies	2		
Total		£915	
Factory:—			
Manufacturing labour	297		
Supervision	32		
Supplies	242		
Maintenance & Repairs, etc ..	135		
Total		70	
General:—			
Salaries	134		
Truck Expenses	149		
Miscellaneous	9		
Total		292	
		£1,913	

LITITZ FIBRE PLANTATION AND FACTORY.
Rainfall for 1922.

1922.	Inches.
January	1.52
February	2.41
March	.39
April	.54
May	1.82
June	.84
July	.57
August	1.65
September	2.75
October	5.71
November	5.38
December	1.13
Total	24.71

BOARD OF MANAGEMENT, LITITZ FIBRE PLANTATION.

The Honourable A. E. Harrison,
Custos of St. Elizabeth.

The Honourable A. G. Nash,
Member for Manchester.

A. C. L. Martin, Esqr.,
Chairman, Parochial Board of Manchester.

H. H. Cousins, Esqr.,
Director of Agriculture,
Chairman.

V. AGRICULTURAL EDUCATION.

REPORT OF HEADMASTER.

Government Farm School,
January 31st, 1923.

Sir,

I have the honour to submit my report on the Farm School for the year 1922.

2. *Numbers.*—The numbers on the books of the school for the year were as follows:—
Easter, 39 Midsummer, 39, Christmas, 39.
The following students completed their course and were awarded certificates:

C. L. Harrison, Fairy Hill	W. L. Shirley, Swift River
A. L. Spence, Darliston	H. A. Box, Lucea
C. J. Bewley, Cross Roads	W. M. Smith, Brit. Honduras
R. E. Taylor, Siloah	R. W. Burgess, Watson Hill
M. S. Morgan, Frahnkfield	V. E. McCleod, Frankfield
J. M. Johnson, Frankfield	E. L. Renau, Brit. Honduras

3. *Staff.*—In August Mr. A. F. Thelwell was seconded for service with the Foot and Mouth Campaign. We had to manage with a master short during the Christmas term and I must acknowledge the assistance rendered by Mr. L. A. Powell who had to do considerable additional work.

During the Christmas term Dr. Rushie Grey was replaced by Dr. Tavares as Lecturer in Veterinary Science.

4. *Athletics.*—Cricket and football were played during the year. In August the school had a very successful athletic meeting. His Excellency the Governor and Lady Probyn were present. Lady Probyn distributed the prizes.

5. *General.*—The usual curriculum was followed. The students rendered valuable assistance in the experiment station and the Stock Farm.

The school is still extremely handicapped by lack of equipment to achieve the best results. I drew your attention to our most pressing needs in a letter during the year under review.

I have the honour to be,

Sir,

Your obedient Servant,

Sgd. ROY S. MARTINEZ,

Headmaster.

REPORT BY MEDICA OFFICER.

Halfway Tree,
19th April, 1923.

Sir,

I have the honour to report that the general health of the students of the Hope Farm School for the year ending December 31st, 1922, has been good.

Several cases of Influenza of a mild type and a few cases of Measles occurred during the year, there was no illness of a serious nature.

All the students have been inoculated against Typhoid and Small pox.

The sanitary conditions are fair but the present type of latrine—the bucket system should be altered to W.C.'s and absorption pits.

I am, Sir,

Your obedient servant,

Sgd. LEWIS A. CROOKS.

The Director of Agriculture,
Hope Gardens.

Report by Veterinary Consultant.

115 Tower Street, Kingston,
17th April, 1923.

Hon. H. H. Cousins, M.A.,
Director of Agriculture,
Hope, Kingston.

Sir,

I have the honour to state that at your request I took up office as the Acting Government Veterinary Consultant on the 23rd October, 1922.

I have lectured to the students of the Farm School for one hour three times a week on Veterinary Science on the following subjects:—

Care of animals in Health and Disease; Hygienic Anatomy, Physiology, Pathology, Shoeing, Pharmacy, Therapeutics, theory and practice of Medicine and Surgery, and also gave demonstrations on the living animals.

The students are divided into three classes, first, second and third year, and the veterinary subjects taught were graded according to class.

I was not called upon to render any professional service to the animals of the Farm.

I was however, called upon to investigate nine outbreaks of disease in different parts of the Island as follows:—

4th November, 1922.—Rio Magno—supposed outbreak of Foot and Mouth Disease among the mules of the Public Works Department. I diagnosed the disease as Mycotic Stomatitis and gave treatment.

13th November, 1922.—Trelawny-Windsor Pen. Supposed outbreak of Foot and Mouth Disease in a horse. Diagnosed, simple ulceration of coronet.

20th November, 1922—Re-visited Rio Magno (Mycotic Stomatitis) by request of Public Works Department. I found ulcerations had spread in some. Ultimately every animal recovered under treatment.

27th November, 1922.—Gregory Park-United Fruit, Company. Supposed outbreak of Foot and Mouth Disease among 3 head of cattle. Diagnosed injuries as follows:—

1. Steer, lame right front foot, no lesions.
2. Steer, lame right front foot, no lesions.
3. Cow, punctured, suppurating wound in coronet left hind foot. Suppurating wound on pad of mouth (hard palate) lacerated, suppurating wound on back portion of tongue on right side, three quarter inch length and bleeding when touched; both these latter conditions due to defective teeth

27th November, 1922.—St. Elizabeth. Extensive outbreak of Anthrax at Hermitage Pen near Black River. Herd consisted of 400 several of which were dying daily, two died the day before my arrrival. The owner Mr. Hendricks informed me that he had vaccinated with Anthraxoids, but as the motality persisted he had used a liquid vaccine, all without benefit. I was furnished by the Department of Agriculture with 400 doses of double Anthrax vaccine which I proceeded to give and the disease was brought to a dead stop.

I next visited Mr. Blair, Swansea, Malvern; his loss from Anthrax was 6 head in the last 6 months. I double vaccinated his remaining six animals which so far as I am aware have continued well. By your nstructions I further investigated the parish of St. Elizabeth, but heard of no further cases of Anthriax.

11th December, 1922—St. Andrew, Collins Green Pen. Supposed outbreak of Foot and Mouth Disease in a cow. Diagnosis, animal lame due to injury.

29th December, 1922.—Portland, Burlington Pen, St. Margaret's Bay. Supposed outbreak of Foot and Mouth Disease in cattle. Diagnosis, ulcerations due to washing with too strong arsenical solution for ticks.

29th December, 1922.—Kingston, Bumper Hall. Supposed outbreak of Foot and Mouth Disease among goats. Diagnosis, severe form of Mycotic Stomatitis.

October 23rd to December 31st, 1922.—There have been no animals imported during this period.

I have the honour to be,

Si ,

Your obedient Servant,

Sgd. E. Tavares.

VI.—PLANT DISEASES AND PESTS.

Advisory Committee on Panama Disease.

The Honourable Sir John Pringle, K.C.M.G.
Adam Roxburgh, Esq.
R. P. Simmonds, Esq.
S. S. Stedman, Esq.
Chairman, H. H. Cousins (Director of Agriculture)
Secretary, C. G. Hansford, B.A., Microbiologist.

REPORT OF GOVERNMENT ENTOMOLOGIST.

Government Laboratory, Hope,
Kingston, 23rd January, 1923.

Sir,

I have the honour to submit my annual Report for the year ending December 31st, 1922.

2. During the period under review I acted as Director of Agriculture from June 23rd to October 23rd.

3. The following insects of economic importance were dealt with during the year:—

Staple Crops.

Citrus.—As in the preceeding years, the Long Scale, *Lepidosaphes beckii*, (Newm.), and the Snow Scale, *Chionaspis minor*, (Comst.), caused considerable damage to all species of *Citrus*.

The Citrus Black Fly, *Aleurocanthus woglumi*, Ashby, does not appear to be gaining ground so rapidly and there is no doubt that, owing to the unsightliness of the trees infested with this Aleurodid, the unhealthiness of the trees which is undoubtedly undue to the less conspicuous scales, such as the Long Scale and the Snow Scale, is attributed to the Black Fly.

Two new species of 'lady-beetles,' *Scymnillodes aeneus*, Sic., and *S. cyanescens*, Sic., have been observed preying on the Citrus Black Fly.

The entomogenous fungi known to attack the Citrus Black Fly is now increased by one—*Aschersonia goldiana*, Sacc.—heavy infestations of which were observed in the valleys of the White and Negro Rivers.

One case of the "Armoured" Scale, *Selenaspidus articulatus*, (Morg.), was reported as seriously attacking the tangerine.

Banana—The Banana Borer, *Cosmopolites sordidus*, Germ., is undoubtedly on the increase in certain districts. This fact is due to (i) the planting of infested suckers, (ii) the disregarding of breeding places, such as abandoned plots and fallen plants, and (iii) the lack of proper cultural and sanitation methods. On the other hand, it is pleasing to be able to state that wherever the trap method of control has been systematically carried out the results have been most satisfactory.

One correspondent submitted two species of earwigs—*Psalis americana* and *Anisolabis annulipes*—stating that they have been observed attacking the grubs of the Banana Borer. Laboratory experiments confirmed this observation, but it was also proved that the diet of these earwigs is very diverse, including such insects as the 'white grubs,' 'white ants,' the grubs of the Striped Weevil, and each other. So, in view of their unrestricted diet and of ther relative fewness, much assistance cannot be expected from them.

Tobacco.—Very serious infestations of the cutworm, *Prodenia ornithogalli*, Guen, and of the larvæ of the Hawk moths, *Protoparce sexta jamaicensis*, (Johan.) and *Celerio lineata*, (L.), occurred on certain tobacco plantations.

Coconut—The Bagworm, *Oiketicus abbottii*, Grote, was for the first time reported attacking the leaves of the coconut.

The Shot-Hole Borer, *Xyleborus perforans*, Woll. was observed in several cases attacking the stems of cooconuts, which were attacked by bacterial or fungoid diseases.

Advice was also sought for the treatment for the Dictyospermum Scale, *Chrysomphalus dictyospermi*, (Morg.), for the White Fly, *Aleurodicus cocois*, (Curt.), and for the plant louse, *Cerataphis lataniae*, Boisd.

Corn.—Reports of the attack of the Fall Army Worm, *Laphygma frugiperda*, (S. & A.), on corn were received from Upper St. Andrew and Western St. Thomas.

Sugar Cane.—No reports were received relative to the Sugar Cane Looper Cutworm, *Moica repanda*, (F.), or to the 'White Grub,' *Lachnosterna jamaicensis*, Arrow.

Sisal.—Only one case of the Sisal Weevil, *Scyphophorus acupunctatus*, Gyl., was observed and the infestations of the Sisal Scale, *Pseudischnaspis bowreyi*, (Ckll.), were appreciably milder.

Cacao.—The only insect reported as attacking this crop during the year was the Akee Fringed Scale, *Asterolecanium pustulans*, (Ckll.). A slug was observed defoliating nursery plants.

FRUITS.

Grape.—The following insects were observed attacking grape:—

The West Indian Peach Scale, *Aulacaspis pentagona*, (Targ.).
The Quince Scale, *Aspidiotus cydoniae*, Comst.
The Masked Scale, *Chrysomphalus personatus*, (Comst.).
The Plant Louse, *Aphis illinoisensis*, Schimer.
The Grape Cane Borers, *Apate terebrans*, Pall., and *A. monachus*, Fab.

Guava.—One case of the White Fly, *Aleurothrixus floccosus*, (Mask.), attacking the foliage was submitted.

Truck Crops.

Cucumber.—Advice was sought for the control of the Plant Louse, *Rhopalosiphum persicae*, (Sulz.) and for the Striped Cucumber Beetle, *Diabrotica themei*, Baly.

Tomato.—The larvae of the Tobacco Hawk moth, *Protoparce sexta jamaicensis*, (Johan.), and the Green Stink Bug ("Mary Grudgful"), *Nezara marginata*, P. de B., were reported as attacking the foliage and fruit, respectively.

Ornamental Plants.

Roses.—Specimens of the scale insects, *Ceroplastes ceriferus*, And., and *Aulacaspis rosae*, (Bouché), were submitted.

Ferns.—Specimens of the scale insect, *Saisselia hemisphaerica*, (Targ.), were submitted.

Stored Grain Pests.

Advice was sought for the control of the Rice Weevil, *Calandra oryzae*, (L.), attacking rice and corn, for the Cadelle Beetle, *Tenebriodes mauritanicus*, and the Rust Red Flour Beetle, *Tribolium ferrugineum*, (L.), attacking oats.

Miscellaneous.

Specimens of the Bot Fly, *Gastrophilus equi*, taken from the stomach of a mule, were submitted for identification.

4. Sixteen visits into the country were made for the purpose of investigating outbreaks of insects and of delivering lectures. Of the latter, eight were delivered on the Banana Borer and one on the Citrus Black Fly.

5. A large number of specimens has been added to the collection of insects.

6. The following publications were issued during the year:—

Bulletin 1—Coccidae (Scale Insects) of Jamaica.
Circular 5—Prevention and Control of Insect Pests.
„ 6—Control Measures against the Citrus Black Fly.
„ 7—Resuscitation of Decadent Citrus Groves.
„ 8—The Banana Borer.

In Press.—

Circular 9—Insect Pests of Tobacco.

I have the honour to be,

Sir,

Your obedient servnt,

C. C. Gowdey.

Government Entomologist.

Report of Microbiologist.

Office of Microbiologist, Hope, Kingston, P.O.
December 31st, 1922.

The Hon. Director of Agriculture,
Sir,

I have the honour to submit the following report on work done in this office during the period April-December 1922; that, is, since my arrival here.

Plant Disease.

The number of samples of diseases plants examined during the above period was 174, as follows:

Bananas	61 samples
Soil samples (in connection with work on Panama Disease)	38 "
Coconuts	5 "
Sugar Canes	3 "
Miscellaneous Samples	67

These were collected as follows:—

From Officers of the Department	67 samples
From Jamaica Agricultural Society	22 "
From Private Persons	16 "
Collected by the Microbiologist	69 "

I.—Panama Disease of Bananas.

During the past year an Advisory Committee has been appointed by His Excellency the Governor to assist the Department in its efforts to control this very serious disease. The Committee consisted of the Hon. Sir John Pringle, K.C.M.G., R. P. Simmonds, Esq., S. S. Steadman, Esq., the late Adam Roxburgh, Esq., the Director of Agriculture, and the Microbiologist, who was elected Secretary.

The disease at the beginning of the year was increasing considerably in the infected districts of the island, but during the course of the year it has apparently been checked. It remains to be seen whether or not this check is merely temporary. The spread of the disease in Jamaica is apparently closely connected with weather conditions. Thus, in the parish of St. Mary, which has been suffering from a prolonged drought during the year, the number of cases of Panama Disease is remarkably small, and most of these cases occurred in districts already infected for some time, and were recurrences adjoining old diseased areas.

During the year the disease has appeared in three new parishes of the Island: St. James, Manchester, and Clarendon. In each of these it is confined to a single district and is apparently well under control.

The Inspection of the island for this disease has been much more thorough during the past year, owing to increased staff. The result is that many new cases have been discovered, of which a considerable proportion was of some long standing, as evinced by the number of diseased plants in them.

The official figures for the cases treated during each month are as follows:—

1922.	No. of Diseased Plants.	New cases.	Recurrences.	Total cases.
January	330	11	80	91
February	503	9	102	111
March	560	24	117	141
April	341	16	116	132
May	370	41	111	152
June	346	17	108	125
July	392	43	84	127
August	208	39	76	115
September	165	27	49	76
October	169	26	57	83
November	208	37	71	108
December	212	42	63	105
Total for year	3,804	332	1,034	1,366

RECORD OF DISEASED PLANTS FOR THE WHOLE ISLAND SINCE 1912.

January–December 1912	625
January–December 1913	164
January–December 1914	128
January–December 1915	165
January–December 1916	231
January–December 1917	154
January–December 1918	208
January–December 1919	279
January–December 1920	456
January–December 1921	1,247
January–December 1922	3,804

Since my arrival in the Island on April 4th., 1922, to take up my present position as Microbiologist, I have given a series of lectures on Panama Disease in most of the infected districts of the Island, with the object of bringing home to the planters and especially to the smaller banana growers, the danger of the disease, and its menace to the whole banana industry of Jamaica. Up to the present the Department has been seriously hampered in its efforts to stamp out the disease by the attitude of the smaller banana growers, many of whom attempt to conceal the disease. In the lectures given, the danger of this was particularly emphasised, the consequences to the grower and also to his plantation being pointed out. During the past year several men have been prosecuted for hiding the disease on their cultivations, and the Plant Disease Law must be even more strictly enforced i n the future.

Evidence has been accumulated during the past few years that banana trash is largely responsible for the spread of the disease, and a new "Order" is being framed to meet this danger.

A number of experiments have been started at Hope and elsewhere with the object of determining if possible whether Panama Disease is spread solely from the diseased plants to the healthy bananas around them, or whether cases in new districts arise by direct infection from the soil; in other words, whether or not the *Fusarium* causing Panama Disease is present in the soil in districts where up to now no cases of the disease have appeared. In this connection a number of soil samples were collected from various parts of the island and examined mycologically in the Laboratory. Many different *Fusaria* were isolated from them, and at present are being compared in the Laboratory with cultures of *Fusarium cubense.*

Experiments are also in progress to devise if possible improvements on our present methods of treatment and control.

A notable discovery was made by Inspector Sutherland during the year; that the plantain, *Musa paradisica,* is not absolutely immune to Panama Disease, as has heretofore been assumed. A specimen was discovered by him in Portland showing typical symptoms of the disease, and a fungus was isolated from the same specimen which is in culture identical with *Fusarium cubense.* During the coming year cross inoculations will be carried out with this strain and that from the banana, to determine whether the fungus from the plantain can infect the banana, and vice versa.

In the course of the experiments carried out during the past year, it has been found that the fungus of Panama Disease is able to live in the soil for at least ten years. An old diseased area of 1912 was planted in bananas again in July, 1922, and in November one of the plants had developed the disease. Since then four other plants have shown the same symptoms. The suckers used for replanting the area were quite free from the disease, and were taken from a district where there is up to now no sign of the disease. The plot has been quarantined since 1912, and had reverted to bush in the meantime. From this it appears that bananas cannnot safely be replanted on any land in Jamaica where the disease has once appeared and thus all such areas of land are useless from the point of view of banana cultivation.

Another point to be determined in the near future is how far it is safe to allow old diseased plots to be replanted with other crops, such as ground provisions, if there are bananas remaining in the near vicinity.

2. Other Plant Diseases.

Other plant diseases observed during the past year were:—

Mosaic Disease of Sugar Cane.		
Red Ring Disease of Sugar Cane	..	*Colletotrichum falcatum.*
Root Disease of Sugar Cane	..	*Marasmius sacchari*
Bacterial Heart Rot of Bananas.		
Black Spot Disease of Bananas	..	*Cercospora musarum*
Marasmius Disease of Bananas	..	*Marasmius spp.*
Tobacco Leaf Spot	..	*Cercospora nicotianae*
Tomato Leaf Mould	..	*Cladosporium fulvum*
Spotting of Mango	..	*Phomopsis sp.*
Bud Rot of Coconut	..	Bacterial (Type 1).
Wilt Disease of Pineapple	..	*Fusarium sp.*
Bud Rot of Pineapple	..	*Phytophthora sp., Thielaviopsis paradoxa, and Bacteria*
Black Rot of Grapes	..	*Guignardia Bidwelli*
Mildew of Grapes	..	*Plasmopara viticola*
Leaf Spot of Sisal ..	..	*Colletotrichum agaves.*

C. G. Hansford,

Microbiologist.

VII.—LIVE STOCK.

Government Stud Farm, Grove Place.

A severe drought occasioned great difficulties and anxiety as to the water supply for the stock. Fortunately the catchment area prove adequate to this occasion and although all the outlying ponds dried out, the supply at headquarters held out and no losses of stock were incurred from lack of water to drink.

In addition, the outbreak of Foot and Mouth Disease in the western parishes necessitated the closing of the Stud Farm to the public for 7 months and thus a serious set-back to the success of the new Stud Farm was brought about.

By careful management the Farm managed to pay its way and earned nearly £300 which reduced the debt on the "Working Account" to £519. All the Stud Bulls were maintained in good health and condition. The eleven imported pedigree cows were losing condition due to the poor feeding during the drought and were transferred to Hope where they seen put on 200 lbs. each in weight.

The native herd was maintained in good condition, 116 calves were dropped during the year including 59 heifer calves by dairy Sires. In addition 51 calves from Hope were reared in substitution for bull calves which were sold to penkeepers and Small Settlers for rearing purposes. The Live Stock was valued by Mr. E. W. Muirhead and set at a total of £7,058. The Valuator expressed his satisfaction at the condition of the animals which was considered to be creditable to the Manager.

The financial records are as follows:—

Live Stock "Grove Place Pen" 1922.

Cattle:—

19 bulls ..	..	1 Zebu-Jersey Bull—"Hon. Mr. Polo"
		1 Montgomery Bull—"Dairyman of Pusa"
		1 Hissar Bull—"Pride of the Punjab"
		1 Nellore Bull—"Majestic"
		2 Devon Bulls—"Drake and Raleigh."
		1 Aberdeen Angus—"Etrurian'
		1 Hereford Bull—"Thunderer"
		2 Grade Holstein Bulls—"Ravager & Hydras."
		2 Pedigree Bull calves of 1922.
		7 Bull calves of 1922.
207 Breeding cows	..	8 Native breeding cows purchased from Hope
		24 Native Holstein cows from Carton, St. Ann's.
		15 Red Polls from Carton, St. Ann's.
		38 Native breeding cows from Copse, Hanover.
		28 Native breeding cows from Grier Field, St. Ann's
		11 Native breeding cows from Mt. Plenty, St. Ann's
		83 Native breeding cows from Dr. Halliday.

125 Heifers	4 Pedigree Heifers.
	2 Hope heifers.
	1 Zebu Jersey heifer.
	25 Native heifers.
	7 Grade Holstein heifers.
	2 Grade Ayrshire heifers.
	11 Grade Guernsey heifers.
	12 Grade Jersey heifers.
	4 Grade Montgomery heifers.
	12 Grade Red Poll heifers.
	10 Grade Swiss heifers.
	35 Grade Zebu Jersey heifers.
8 Steers	8 Plough steers.
359	

Horsekind:—

1 Imported Thoroughbred Stallion, "Water Jacket."
1 Imported Proof Ass "Kentucky Boy"
12 Brood mares.
4 Fillies
3 Horse Colts.
2 Geldings.
15 Mules.
3 Donkeys
41 Head.

GROVE PLACE WORKING ACCOUNT, 1922-1923.

Revenue—			
Rearing calves	£423 11 0		
Sale of Stock	479 18 4		
Stud and Pasturage	270 0 7		
Sleepers and Fence Posts	130 10 0		
Rents	22 5 0		
Produce	80 7 11		
Dipping	11 3 11		
Miscellaneous	39 19 10		
	£1,457 16 7		
Less amt. not lodged	11 11 3	£1,446	5 4
Expenditure:—			
Wages	383 6 10		
Repairs, Tools & Equipment	22 7 0		
Upkeep of Property	81 0 1		
Crops	28 12 2		
Food and Drugs	221 7 5		
Transport of Stock	28 11 0		
Sleepers and Fence posts	56 2 3		
Stud Expenses	34 3 3		
Rearing calves	48 0 0		
Planting & Clearing Pastures and Commons	130 5 2		
Travelling Expenses	30 16 8		
Purchase of Stock	40 0 0		
Miscellaneous	62 16 9	1,167	8 7
Excess Revenue 1922-23		278	16 9
Debit Balance on 1.4.22		798	0 0½
Debit Balance on 31.3.23		519	3 3½

SERVICES BY BULLS AT GROVE PLACE, 1922-1923.

Bulls.	Visiting Cows.	Farm Cows.	Total
1. Hereford, "Peacemaker"	10	1	11
2. Sussex, "The Arab"	14	..	14
3. North Devon, "Rentpayer"	17	1	18
4. Brown Swiss, "Trumpeter"	25	26	51
5. Aberdeen Angus, "Popinjay"	2	2	4
6. Jersey, "Hector"	22	14	36
7. Zebu-Jersey, "Hon. Mr. Polo"	9	..	9
8. Red Poll, "Pilot"	10	14	24
9. Montgomery, "Dairyman of Pusa"	4	4	8
10. Ayrshire, "Cyril"	8	23	31
11. Ayrshire, "Food Controller"	..	6	6
12. Holstein, "Homestead"	—	16	16
13. Hissar, "Pride of the Punjab"	—	3	3
14. Guernsey, "Liza's 1st Plato"	..	1	1
Total	121	111	232

The rainfall at Grove Place for 1922 was as follows:—

GROVE PLACE, RAINFALL RECORD, 1922.

January	1.15 inches
February	1.23 "
March	2.31 "
April	1.73 "
May	1.11 "
June	2.66 "
July	.72 "
August	2.19 "
September	3.02 "
October	8.25 "
November	2.12 "
December	2.25 "
Total	28.74 inches

GOVERNMENT STOCK FARM, HOPE.

On the 31st December, 1922, the Live Stock belonging to the Government Farm at Hope consisted of the following animals:—

Pedigree Stock:—	*Cattle.*
44 Red Polls	1 Imported Red Poll Bull
	9 Native Red Poll Bulls.
	5 Imported Red Poll cows.
	29 Native Red Poll cows and heifers.
33 Jerseys	2 Imported Jersey Bulls.
	3 Native Jersey Bulls.
	6 Imported Jersey Cows.
	22 Native Jersey cows and heifers.
7 Guernseys	3 Native Guernsey Bulls.
	2 Imported Guernsey cows.
	2 Native Guernsey heifers.
6 Ayrshires	1 Imported Ayrshire Bull.
	2 Native Ayrshire Bulls.
	2 Imported Ayrshire cows.
	1 Native Ayrshire heifer.
5 Brown Swiss	5 Brown Swiss heifers.
1 Holstein	1 Imported Holstein Bull
31 Zebu-Jerseys	1 Zebu Jersey Bull
	30 Zebu Jersey cows and heifers.
1 Zebu Red Poll	1 Zebu Red Poll heifer.
1 Montgomery	1 Imported Montgomery Bull.
	129
Non-Pedigree Stock:—	6 Grade Guernsey Bulls.
	3 Grade Holstein Bulls.
	5 Grade Montgomery Bulls.
	1 Grade Swiss Bull.
	1 Grade Ayrshire Bull.
	5 Canadian Dairy cows.
	125 Native Dairy cows.
	3 Native Breeding cows.
	3 Native Heifers.
	2 Grade Ayrshire heifers
	13 Grade Guernsey heifers.
	14 Grade Holstein heifers.
	13 Grade Jersey heifers.
	13 Grade Montgomery heifers.
	1 Grade Nellore heifer.
	5 Grade Red Poll heifers.
	6 Grade Swiss heifers.
	2 Grade Zebu Jersey heifers.
Total Non-pedigree cattle	221
	16 Steers.
Total number of Cattle	366

HORSEKIND.

8 Working mules.

POULTRY

4 Pens	.. ..	Rhode Island Red. Plymouth Rock. Indian Game. White Leghorn.
Bees	..	20 Colonies.

Weekly Analysis of Milk supplied to the Public Hospital and Lunatic Asylum by the Stock Farm, 1922

Quarter ending	Solids.	Fat.	Sp. Gravity.	Solids not Fat.
March 31, 1922	12.82	4.31	1.0299	8.51
June 30 1922	12.54	4.05	1.0311	8.49
Septr. 30, 1922	12.66	4.19	1.0301	8.47
Decr. 31, 1922	13.34	4.70	1 0302	8.64
Average for yr. 1922	12.84	4.31	1.0303	8.53

The following is the Summary of the Valuation of Live Stock at the Farm on the 31st De ember, 1922.

Cattle	£9,210
Horsekind	178
Poultry	38
Bees	25
	£9,446

RECORD OF DAIRY HERD MILK YIELD, 1922.

Month.	Av. No. of Cows.	Total Qts. per mensem.	Av. per. Cow Qts.
January	71	8788.0	4.0
February	70	7406.8	3.8
March	68	9142.0	4.3
April	62	7788.6	4.2
May	69	9305.1	4.3
June	76	8695.4	3.8
July	74	9435.7	4.1
August	76	9626.1	4.1
September ..	74	9433.0	4.2
Oc ober	69	8394.8	3.9
November ..	75	8889.8	3.9
)ecember ..	77	9240.5	3.8
Average ..	72	106145.8	4.0

MILK YIELD, DAIRY HERD 1918, 1919, 1920, 1921, 1922.

Imperial Quarts per diem.

Month.	1918.	1919.	1920.	1921.	1922.
January	282.4	280.8	279.8	199.1	283.5
February	257.5	305.1	299.8	291.2	264.5
March	231.9	268.7	245 1	338.8	294.9
April ..	265.9	276.7	239.6	338.5	259.6
May ..	226.1	383.6	194.5	309.3	300.1
June ..	211.8	394.4	190.2	304.0	289.8
Ju y ..	231.7	308.8	194.7	299.0	304.3
August ..	273.7	286.2	186.5	288.7	310.5
)ep ember	302.7	312.7	207.1	332.8	314.4
October ..	298.3	316.7	250.7	287.8	270.8
November	378.0	255 0	286.8	263.5	296.3
December ..	318.3	241.5	230.6	269.4	298.0
Average	273.2	302.5	233.8	293.5	290.5

MILK YIELD 1922.

Order.	Name of Cow.	Breed.	Age in years.	Average content Milk Fat.	Lbs. of Milk.	Milking weight.	Milk Yield Imp. Qts.	Sale value of milk 11d per Qrt. to 30.4.22 and 8d. per Qt. to 31.12.22
1	Carmen	Grade Guernsey	8	3.8	5,348	910	11.7	£75 10 8
2	Honeybelle	Amer. Jersey	12	4.8	4,787	854	9.4	70 9 2
3	Rosette 2nd	Grade Guernsey	4	4.1	4,550	850	15.5	66 2 0
4	Badge	Zebu-Jersey	9	4.3	4,465	970	13.6	58 18 4
5	Badge 2nd	Zebu-Jersey	4	4.1	4,392	848	14.4	64 14 7
6	Monica	Can. Grade Guernsey	12	3.7	4,349	946	7.9	66 7 5
7	Violet 2nd	Grade Zebu-Jersey	5	4.1	4,292	860	12.0	64 5 8
8	Hope Flighty	Native Red Poll	5	3.6	4,163	850	15.9	53 11 4
9	Fifi	Grade Jersey	7	3.7	4,160	884	11.3	62 2 10
10	Lydite 11th	Grade Zebu-Jersey	5	3.9	4,081	800	14.2	61 6 0
11	Honey	Zebu-Jersey	8	4.0	4,076	1,084	9.4	60 16 6
12	Diva	Can. Grade Guernsey	11	4.6	4,038	730	11.0	61 15 6
13	Diva 1st	Grade Gurensey	8	6.4	4,034	794	7.8	62 2 9
14	Rosette	Grade Guernsey	8	4.1	3,994	876	9.6	60 15 7
15	Pansy	Amer. Jersey	12	4.6	3,974	912	10.9	59 3 6
16	Ellenstine 2nd	Zebu-Jersey	5	3.8	3,932	700	8.8	53 1 0
17	Lydite	Holstein Ayrshire	11	3.7	3,924	998	11.2	59 6 0
18	Polka Dot	Amer. Red Poll	5	3.9	3,821	1,054	10.4	57 12 8
19	Pobess	Grade Red Poll	8	3.9	3,778	990	10.1	53 5 8
20	Marchioness 1st	Zebu-Jersey	6	3.8	3,708	812	10.9	53 1 9
21	Beetroot	Holstein Red Poll	4	3.6	3,600	660	10.6	52 4 5
22	Monica 1st	Grade Zebu-Jersey	7	3.3	3,584	830	9.9	47 8 4
23	Bunny	Grade Holstein	6	4.2	3,514	1,000	8.7	47 17 2
24	Diva 4th	Grade Zebu-Jersey	5	5.6	3,492	850	11.0	50 7 6
25	Fanny 2nd	Zebu-Jersey	4	4.5	3,459	800	9.1	46 4 6
26	Perfection	Amer. Jersey	7	4.9	3,445	900	13.1	52 10 4
27	Diva 2nd	Grade Zebu-Jersey	7	5.8	3,419	900	11.4	45 15 2
28	Beta	Red Poll	11	3.3	3,399	940	7.3	50 19 4
29	Norbrook	Native Ayrshire	8	4.7	3,363	962	9.2	46 1 8
30	Shrew 2nd	Zebu-Jersey	7	5.1	3,334	1,070	9.0	44 15 0
31	Brown Blossom	Imported Ayrshire	7	3.8	3,246	920	11.0	48 12 7
32	Rum	Grade Jersey	6	4.9	3,202	840	9.5	48 16 11
33	Desiree 1st	Red Poll	6	3.9	3,195	860	10.1	49 4 2
34	Joan 1st	Grade Zebu-Jersey	4	3.8	3,195	696	7.0	45 12 11
35	Hope Pansy	Jersey	6	4.5	3,128	722	12.9	40 15 8
36	Nana	Grade Holstein	4	3.8	3,120	922	11.6	46 13 3
37	Lady Greta	Amer. Red Poll	5	3.8	3,074	1,090	9.2	46 6 2
38	Pussy	Grade Red Poll	7	4.8	3,039	936	10.8	46 13 3
39	Casilda 2nd	Grade Zebu-Jersey	4	3.7	2,997	670	8.7	39 18 4
40	Lizzie	Grade Jersey	11	4.3	2,990	990	9.0	42 16 0
41	Hope Partridge 1st	Native Jersey	4	4.8	2,988	720	9.1	40 0 0
42	Hectors Cora	Grade Jersey	4	4.9	2,969	626	7.1	42 8 4
43	Monica 2nd	Grade Zebu-Jersey	6	3.4	2,924	972	8.5	38 5 6
44	Janetstine	Jersey	2	3.4	2,915	920	8.0	44 5 1
45	Tilda	Grade Red Poll	9	3.7	2,870	1,340	6.9	45 1 2
46	Beta 2nd	Red Poll	4	3.3	2,855	750	5.5	38 3 1
47	Dodo 1st	Grade Holstein	3	4.0	2,850	800	7.8	41 19 1
48	Foxy 1st	Zebu-Jersey	5	4.2	2,802	720	6.4	37 19 3
49	Quail 2nd	Zebu-Jer ey	5	5.2	2,765	784	8.5	40 8 7
50	Hector's Ethelstine	Jersey	4	4.5	2,760	730	7.7	37 2 6
51	Para	Grade Holstein	4	3.8	2,720	1,036	15.9	39 11 0
52	Fanny	Grade Jersey	11	4.3	2,710	990	7.5	39 1 1
53	Baby	Grade Jersey	4	4.2	2,669	612	8.5	38 9 1
54	Shrew 11th	Grade Guernsey	3	3.6	2,630	740	8.2	34 13 6
55	Cordite 2nd	Grade Zebu-Jersey	5	4.5	2,626	744	6.5	34 2 7
56	Purity	Imp. Red Poll	9	4.3	2,497	1,240	9.2	40 8 5
57	Angel 1st	Grade Holstein	3	4.1	2,479	1,060	7.4	37 3 4
58	Hope Bee A	Red Poll	4	3.7	2,476	997	7.0	36 6 9
59	Dora	Grade Jersey	7	4.5	2,469	726	6.8	35 18 2
60	Quail 11th	Zebu-Jersey	3	4.0	2,447	580	5.8	31 7 7
61	Pomona	Grade Jersey	5	4.2	2,422	720	9.0	37 6 11
62	Butterfly	Jersey	3	4.4	2,397	932	9.0	38 11 8
63	Freda	Grade Holstein	6	3.3	2,390	989	5.9	34 6 1
64	Matilda 2nd	Grade Jersey	5	4.1	2,355	730	9.4	35 10 8
65	Dolly	ZebuJe-rsey	8	5.0	2,340	956	9.8	30 3 4
66	Hector's Gem	Jersey	3	4.8	2,334	642	5.6	31 19 10
67	Hope Mead	Jersey	4	4.8	2,308	712	6.7	31 17 7
68	Violet 3rd	Grade Holstein	4	3.5	2,305	664	7.8	34 3 6
69	Pride's Monica	Grade Guernsey	8	4.1	2,299	766	10.0	3 2 2
70	Ethelstine	Jersey	6	4.3	2,265	716	9.3	30 18 6
71	Hope, Pretty 1st	Native Red Poll	5	3.4	2,178	790	7.7	28 12 9
72	Badge 1st	Zebu-Jersey	6	4.7	2,162	814	6.7	30 2 0

Stock Farm Working Account, 1922-23.

Revenue—			
Stud & Pasturage	£ 5 16 0		
Tenants	32 6 1		
Sale of Stock	627 15 0		
Milk	3,749 17 7		
Miscellaneous	278 10 2		
Poultry	27 14 1		
Cordwood	90 9 0		
Dipping	4 0 11	£4,816 8 10	
Expenditure—			
Wages	861 11 7		
Machinery, Repairs & Implements	618 17 0		
Food for Stock	1,622 7 7		
Purchase of Stock	6 0 0		
Rearing Calves	423 11 0		
Foremen	145 0 0		
Miscellaneous	381 8 0		
Clearing Fencing	341 17 6		
Cutting Wood	59 1 0	£4,459 13 8	
Debit Balance b/d 1.4.22	324 7 5		
Ex ess Revenue		356 15 2	
Cash Deficit 1.4.22		324 7 5	
Cash Balance 31.3.'23		32 7 8	

Live Stock Capital Account 1922-23.

Capital Estimates—

	£ s. d.
1909-1910	500 9 0
1910-1911	247 0 0
1911-1912	883 12 4
1912-1913	710 0 7
1913-1914	..
1914-1915	..
1915-1916	..
1916-1917	..
1917-1918	..
1918-1919	..
1920-1921	..
1921-1922	..
1922-1923	..
Total Capital from General Revenue	£2,341 1 11
Valuation 31st March 1923	9,200 0 0
Balance at Credit 31.3.23	6,858 18 1
Balance at Credit 31.3.'22	6,846 18 1
Increased value during 1922-1923	12 0 0

Progress Record.

	£ s. d.
Balance at credit 31.12.12	1,237 8 1
" " 31.12.13	1,022 3 1
" " 31.3.15	627 9 7
" " 31.3.16	567 4 1
" " 31.3.17	1,077 19 1
" " 31.3.18	2,041 6 1
" " 31.3.19	2,821 12 1
" " 31.3.20	4,587 18 1
" " 31.3.21	7,336 18 1
" " 31.3.22	6,846 18 1

Provisional Balance Sheet to 31st March, 1923.

Live Stock Net purchases 1909-22		£2,598	15 8	Live Stock	..	£9,200	0 0
Live Stock Purchases 1922-23	£6 0 0			Dead Stock & Buildings		1,223	15 0
Live Stock Sales 1922-23	£627 15 0	621	15 0	Food in Stock	..	477	5 0
				Accounts receivable	..	163	7 5
Live Stock Net purchases to 31.3.23		1,977	0 2	Kintyre Pen	..	300	0 0
Live Stock Net purchases to 31.3.23		1,977	0 2	Cash balance at Treasury		32	7 8
Accounts payable		7	6 0				
		1,984	7 2				
Balance Assets	..	9,412	7 11				
		11,396	15 1			11,396	15 1

Balance Assets 1922-23	..	£9,412 7 11
Balance Assets 1921-22	..	8,439 17 10
Improvement in year's work		972 10 1

Progress Record.

Improvement in year's work 1916-1917	..	£825 3 7
" " " 1917-1918	..	995 1 6
" " " 1918-1919	..	584 7 5
" " " 1919-1920	..	3,093 6 11
" " " 1920-1921	..	588 9 5
" " " 1921-1922	..	795 17 10
" " " 1922-1923	..	972 10 1
Average for seven years	..	1,122 2 5

Government Laboratory, Hope Gardens, Kingston,
24th January, 1923.

Sir,

I have the honour to submit the following report on the work done at the Government Laboratory during the year ending 31st December, 1922.

The total number of samples dealt with was 1,497, as compared with 1,233 in 1921, and establishes a record over any previous year.

The samples may be classified as follows:—

"A" Official.

(i) *Police—*

Human Viscera and Organs	20
Substances examined for poison	6
Foods examined for poison	10
Medicines	8
Articles of clothing	4
Ganga	34
Arson Exhibits	12
Counterfeit coins	10
Counterfeiting exhibits	43
Gasolines	4
Miscellaneous	1
	152

Under the Petroleum Laws—

Kerosine Oils	2

Under the Adulteration of Food & Drugs Law 25 of 1908.

	Genuine	Adulterated	Rejected.	
Fresh Milks	10	3	3	16
Total Police ..				170

(ii) *Customs—*

Native Wines	57
Rectified Spirits and Absolute Alcohols	34
Rums	2
Whiskies	2
Gins	2
Denatured Alcohols	2
Flavouring Extracts	3
Wines and Liqueurs	2
Condensed and Evaporated Milks ..	9
Fuel Oils	17
Motor Alcohols	2
Gasolines	3
Kerosine Oils	1
Turpentines	2
Disinfectants	4
Miscellaneous	12
Total Customs ..	157

(iii) *Public Works Department—*

Waters	2
Gasolines	2
Kerosine and Fuel Oils	4
	8

(iv) *Jamaica Government Railway—*

Steam Coals	10
Fuel Oils	2
Waters	1
Miscellaneous	1
	14

(v) *Island Medical Department—*

Fresh Milks	1
Total Official	350

"B" Agricultural.

Soils and Sub-Soils	5
Canes	17
Cane Juices	2
Molasses	7
Orange Oils	1
Artificial Limes	3
Artificial Manures	9
Sisal refuse	1
Miscellaneous	3
Total ..	48

"C" General.

Stock Farm Milks	720
Sugars	164
Cattle Dips	73
Waters, potable	30
" boiler feed	7
Rums	21
Fresh Milks	24
Drugs and Medicines	5
Oils (fixed and mineral)	5
Steam Coals	2
Substances examined for Poison	3
Foods examined for poison	4
Coins (Gold)	6
Gasolines and Turpentines	3
Animal Viscera for Poison	3
Condensed Milks	7
Rice	4
Oils (vegetable)	3
Minerals	5
Miscellaneous	10
Total	1,099
Grand Total	1,497

Official Samples.

The 20 analyses of human viscera and organs were made in connection with 12 deaths. In three cases only was poision found and recovered from the viscera:—

1. 8½ grains of Arsenious Oxide from the organs of a man.
2. ¾ grain of Arsenious Oxide from the viscera of a woman who was treated with Cooper's Dip mistaken for Jeye's Fluid.
3. Hydrocyanic Acid equivalent to 1 1-10 grains of Potassium Cyanide from the stomach and content of a man who committed suicide.

In the samples suspected of containing poison were found:—

1. Large traces of Antimony in an "Egg flip" which caused acute antimonial poisoning in three persons.
2. 2 grains of Copper Sulphate per fluid ounce in Coffee.
3. A blue paste used by a girl in an attempt to poison her father was found to contain 1.5% of Phosphorus.
4. Strong commercial Sulphuric Acid (used by a woman to maim her one-time lover) revealed the fact that the "gentle sex" here are well acquainted with the detestable crime of vitriol throwing.

Most of the Counterfeit coins examined on behalf of the Police were found to consist of Tin, or else Tin and Lead, and point to the fact that strip tin and solder are the chief metals used by local counterfeiters.

The number of samples (16) submitted by the Police under the Food and Drugs Law is the smallest number yet recorded in any year, and the Law must therefore be regarded at present as practically a "dead letter." This is much to be regretted, particularly in view of the large percentage of adulterated samples detected in former years.

The number of samples submitted by the Customs and other Government Departments shows a steady annual increase and their examination leaves little time for the chemist to undertake new work in connection with agricultural and other problems.

Agricultural.

Various analysis of soils were carried out during the year on behalf of the Public.

A number of artificial manures were analysed on behalf of individual purchasers as a check on the quality of the manures supplied by dealers.

Complete analysis of 17 varieties of cane were made in connection with manurial experiments conducted by the Superintendent of Agriculture.

General.

Analysis of the milk produced by individual cows and the mixed milk of the stock at the Government Stock Farm at Hope were carried out during the year. The results showed the maintenance of a high standard of quality, and the Public Institutions supplied by the Farm receive fresh milk much above that usually vended locally.

164 samples of sugar were Polarised during the year on behalf of various estates and merchants and Certificates of Polarisation issued. Only two samples were examined on behalf of shippers under the Government Sugar Test inaugurated in 1921. Shippers are apparently disinclined to take advantage of the scheme owing to the fees payable to the Revenue Authorities for superintending the sampling of shipments.

During the year the testing of Cattle Dips on behalf of various Penkeepers was carried out, and provided a safer check on doubtful field tests made by inexperienced operators.

The quarterly chemical examination of the Kingston water supplies were carried out and demonstrated the maintenance of good organic purity throughout the period. Analyses of the Ferry River water again demonstrated this source of supply to be a water of good organic purity.

Numerous analyses of fresh milks, food products, rums, etc., were carried out during the period on behalf of the general public and reports made thereon.

The distribution of various commodities supplied to the public was continued during the year, and the greatly increased demand for Paranaph and Arsenite of Soda for cattle dipping was successfully met. In this connection it may be mentioned that the Laboratory has over 400 individual accounts on its books, the keeping of which, along with the putting up and shipping of commodities, calls for the entire time of an Assistant.

The following tables shows the amount of the various commodities supplied during the year in comparison with the two previous years:—

	1920.	1921.	1922.
Paranaph	10,052	18,166	27,323 lbs.
Arsenite of Soda	4,338	9,453	16,170 "
Copper Sulphate ..	1,504	726	79 "
Carbon Bisulphide ..	1,266	1,068	463
Rat Poison (bulk) ..	334	227	174
Rat Poison (1 oz. packets).	..	..	245 packets
Thymol powders ..	171	400	259 ozs.
Standard Iodine Solution	8,000	20,000	39,000 C.C.

In addition to the above 84 complete Field Testing Outfits were issued, and also large quantities of Soda Bicarbonate and specially prepared Starch Solution for Dip testing.

During the past year an experimental condensed milk plant has been installed, and it is hoped that some useful results will be obtained in the near future.

An investigation into the radio-activity of the mineral springs for the Island has commenced following on the arrival of the present Deputy Island Chemist.

Both the receipts of money for the sale of chemical preparations supplied by the Laboratory, and the Fees for analyses paid into the Treasury, show a marked increase over previous years. This is shown in the appended table.

Amount lodged in Treasury for Calendar year:—

	1919.	1920.	1921.	1922.
	£ s. d.	£ s. d.	£ s. d.	£ s. d.
Laboratory Fees ..	26 0 0	48 14 0	49 11 0	65 19 1
Laboratory Sales ..	484 1 6	477 6 2	636 17 10	1,105 15 6

There are, at present, three apprentices on the staff of the Laboratory and these are being instructed in various methods of chemical analyses.

I have the honour to be,

Sir,

Your obedient servant,

W. Leigh Barnett, B.A., B.Sc., A.I.C.,

Deputy Island Chemist.

The Hon. Director of Agriculture & Island Chemist,
Hope, Kingston, P.O.

IX.—AGRICULTURAL LEGISLATION IN 1922.

A. Laws Relating to Agriculture Passed during the Year, 1922.

Law No.	Date Assented to	Short Title.	Chief Provisions.
3	May 4.	Sugar industry aid Loans Law 1921. Supplemented Law, 1922.	To authorise further Loans to Planters up to £300,000 on the terms of the principal Law.
10	July 3.	The Drugging of Animals Law.	Prohibiting the administration of any poisonous or injurious drugs to horses, cattle and domestic animals.
29	December 13.	Contagious Diseases of Animals (Inland) Law, 1922.	Consolidating Law relating to Contagious Diseases of animals.

B. Orders, Rules, etc., Relating to Agriculture made during the year 1922.

Date.	Description.	Subject.
1922.		
24th April	Order under Law 24 of 1890	Removing restrictions against the importation of Dogs from the United Kingdom into Jamaica.
8th May	Order under Law 41 of 1920	Ordering the constructiion of Dipping Tanks before 1st August, 1922, on all holdings with 100 head of cattle.
14th June	Order under Law 3 of 1915.	Prohibiting the removal of banana trash from buying stations and ordering it to be burnt.
25th July	Order under Law 1 of 1909.	Declaring Necrotic Stomatitis a contagious Disease.
27th July	do	Declaring certain areas in St. James, Hanover and Westmoreland to be "Infected areas."
29th July	do	Revoking the Order published in Gazette of July 27th and declaring the entire parishes of St. James, Hanover and Westmoreland to be in fected places.
26th September	do	Order declaring St. James, Hanover, Westmoreland and a portion of the parish of St. Elizabeth to be infected with Foot and Mouth Disease.
3rd October	Order under Law 41 of 1920	Ordering the construction of Dipping Tanks before 1st January, 1923, on all hioldings with 100 head of Cattle.
21st December,	Order under Law 29 of 1922	Rules for Regulating and dealing with the Disease known as Foot and Mouth Disease.
22nd December	Order under Law 29 of 1922.	Declaring St. James, Hanover, Westmoreland and St. Elizabeth to be infected with Foot and Mouth Disease.
22nd December	Order under Law 29 of 1922	Prohibiting Race Meetings in St. James, Hanover, Westmoreland and St. Elizabeth.
29th December	Order under Law 29 of 1922	Additional Rules for regulating and dealing with the disease known as Foot and Mouth Disease.

Staff.

Leave.—The Director obtained 4 months leave and proceeded to England. During his absence Mr. C. C. Gowdey, Government Entomologist acted as Director of Agriculture.

Ghanges.—Mr. G. D. Goode, first Class Clerk was promoted Chief Clerk.

Miss D. Carnegie obtained a transfer to the Registrar of Titles Office and her place was subsequently filled by Miss D. Golding.

Mr. R. F. Henly resigned in March and Miss I. Donaldson was appointed to fill the vacancy.

Miss I. M. Swaby was added to the Staff in December.

Messrs. P. W. Murray, Superintendent of Agriculture, C. F. Thomson, Superintendent of the Grove Place Stock Farm and A. F. Thelwell, Assistant Master, Farm School, were appointed Commissioners to deal with Foot and Mouth Disease. Mr. E. U. Lewis acted as Manager at Grove Place and Mr. C. L. Harrison a former Farm School student was appointed to assist Mr. Lewis.

Mr. C. G. Hansford, Government Microbiologist, arrived in April, and Mr. W. L. Barnett, Deputy Island Chemist arrived in November and assumed their duties.

Mr. J. B. Sutherland was promoted Supertending Inspector of Plant Disease.

Messrs. E. M. Brown, N. R. McHardy and O. L. Crichton were appointed Inspectors of Plant Diseases.

The Staff at the Lititz Sisal Factory consisted of:—

R. A. Burgess, Supervisor.
H. V. Silvera, Assistant Engineer.
W. C. Cawood, Chief Engineer.

I have the honour to be,
Sir,
Your obedient servant,
H. H. Cousins,
Director of Agriculture, and Island Chemist.

The Honourable The Colonial Secretary,
Kingston.